to the point where he could not continue his official duties. He used to come to the floor and beg for this bill to pass so others suffering from Parkinson's would have a chance.

I dedicate my vote in support of this bill in support of Lane Evans, the veterans, and so many others who are counting on us to move this research forward. Dr. Elias Zerhouni, the Director of the NIH, stated our Nation would be better served if federally funded scientists had access to embryonic stem cells for research. He separated himself from the Bush administration's official position. He said:

It is not possible for me to know how we can continue the momentum of science and research with the stem cell lines we have at NIH that can't be funded. From my standpoint as director of the NIH, it is in the best interest of our scientists, our science, and our country that we find ways and the nation finds a way to go full speed across adult and embryonic stem cells equally.

I am not going to argue against research using cord blood, adult stem cells, the type of stem cells described by Senator ISAKSON in his bill. But I think we have a moral obligation to the men and women who are counting on us to open this research to find cures. This is our chance, with passage of this bill.

I will vote in favor of both S. 5, the Harkin bill, and S. 30, the Isakson bill, to support all ways of deriving stem cells in a positive way to save lives. If you are in favor of human life and making it better, this is your chance. What matters most in this debate is that we aim to make good on the promises we vowed to keep. Let's support the research that can lessen so much pain for so many and support S. 5.

I reserve the remainder of my time.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. ISAKSON. Mr. President, I will be brief. I will take a portion of the remainder of our time and yield back the rest. I compliment Senator DURBIN on his excellent remarks. Referring back to Senator DORGAN's and Senator SMITH's speeches and so many other speeches, I think this has been a terrific debate.

I compliment the Senator from Iowa tremendously. We all gained a great deal of education. I think, with rare exception, we have seen exhibited a passion to further embryonic stem cell research. The questions are not if that is what we should do but how we go about doing it.

What I have tried to do, and Senator HARKIN and I had a great exchange last night when we educated one another on our positions, but what I tried to do is open a door that already existed, a door that brought about 5 of the 21 embryonic stem cell lines that are currently under NIH approval. But as Senator HARKIN and others have stated, those lines have now been experimented on for 5½ years, using mice, they have developed pollution or less-than-quality lines. It is time for us to find a way to further the science, to reach out for those discoveries and do so. S. 30, which I am here to advocate for, affords that opportunity because it allows the NIH to invest future funds in embryonic stem cell research on embryos derived from Level III Gardner principle remainders and in vitro fertilization, arrested embryos, as they are referred to in some cases, dead embryos as referred to in other cases, but in all cases embryos that are no longer going to become a life but do generate and contain pluripotent embryonic stem cells.

In the end, I feel that approach satisfies the questions raised at the White House and affords us an opportunity of a bill that will be signed by the President and does what everybody on this floor supports, with rare exception, I believe, or maybe no exception once done, and that is the expansion and the extension of the research.

I end where I began with my remarks a minute ago. I compliment Senator HARKIN and others who have spoken and the advocacy that has been here today and the level and quality of this debate on this subject. I look forward to this afternoon and the remaining 3 hours as we lead up to the votes.

I guess I would say the same thing the Senator from Iowa would say. If any Members want to speak this afternoon, it is time to let us know now rather than later because we will have 3 hours equally divided between four different groups.

With that said, I yield back the remainder of my time.

Mr. HARKIN. Mr. President, I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The assistant legislative clerk proceeded to call the roll.

Mr. HARKIN. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

RECESS

Mr. HARKIN. Mr. President, I ask unanimous consent that the Senate now stand in recess until the hour of 2:15 p.m.

The PRESIDING OFFICER. Under the previous order, the Senate will stand in recess until the hour of 2:15 p.m.

Thereupon, the Senate, at 12:23 p.m., recessed until 2:15 p.m. and reassembled when called to order by the Acting President pro tempore.

STEM CELL RESEARCH ENHANCEMENT ACT OF 2007

HOPE OFFERED THROUGH PRINCIPLED AND ETHICAL STEM CELL RESEARCH ACT—Continued

Mr. ISAKSON. Mr. President, I suggest the absence of a quorum and ask that the time that runs count equally against both sides for the remainder of the debate.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered. The clerk will call the roll.

The assistant legislative clerk proceeded to call the roll.

Mr. HARKIN. Mr. President, I ask unanimous consent the order for the quorum call be rescinded.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered.

Mr. HARKIN. Mr. President, I ask unanimous consent that Senator STEVENS be added as a cosponsor of S. 5.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered.

Mr. HARKIN. I suggest the absence of a quorum.

The ACTING PRESIDENT pro tempore. The clerk will call the roll.

The assistant legislative clerk proceeded to call the roll.

Mr. BROWNBACK. Mr. President, I ask unanimous consent the order for the quorum call be rescinded.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered.

Mr. BROWNBACK. I believe under the previous agreement I have 30 minutes at this time, may I inquire of the Chair?

The ACTING PRESIDENT pro tempore. Approximately 30 minutes—44 minutes, the Senator has.

Mr. BROWNBACK. I want to introduce to the body, into the discussion, a gentleman I had a chance to meet who came in front of a Senate Commerce, Science and Transportation Subcommittee—Keone Penn. I have a picture of this young man here. I want to share his story. He was cured of sickle cell anemia. We use that term advisedly, but clearly, cured of sickle cell anemia through cord blood adult stem cell treatment—cured.

I want to do part of this to encourage other people out there who might by chance be listening or know somebody else who has sickle cell anemia who has not yet been able to get treated; to talk about cures using cord blood. We have cord blood banking. That is taking place. Cord blood is the blood between the mother and the child when the child is in the womb, and the use of it, which we have now banked—10,000 units roughly have been banked and used throughout the country for many types of illnesses and sicknesses. I want to talk about curing sickle cell anemia in some cases using cord blood.

Sickle cell anemia is a disease that afflicts more than 70,000 Americans and a disproportionate number of African Americans. Keone tells the story the best so I will just highlight what he stated in front of a Senate science subcommittee hearing that I chaired. He said:

My name is Keone Penn. Two days ago I turned 17 years old. Five years ago they said I wouldn't live to be 17. They said I'd be dead within 5 years.

I was born with sickle cell anemia. Sickle cell is a very bad disease. I had a stroke when I was 5 years old. Things got even worse after that. My life has been full of pain, crises, blood transfusions every 2 weeks, and more times in the hospital than I can count.

The year before I had my stem cell transplant I was in the hospital 13 times. I never was able to have a normal life. My stem cell transplant was not easy, but I thank God that I'm still here. I will graduate from high school and I want to become a chef because I love to cook. I think I'm pretty good at it.

Sickle cell is now a part of my past. One year after my transplant I was pronounced cured. Stem cells saved my life.

Many have heard of Keone's amazing story on previous occasions, and the effectiveness of cord blood stem cell research for such diseases rightly gives hope to millions.

Keone's story is yet another of a great litany of adult stem cell successes.

I want to focus now on the cord blood stem cell successes and why we should not be directing research dollars down other paths, such as embryonic stem cell and human cloning that have not produced these sorts of cures or these sorts of treatments, when we could do a lot more with treatments in the cord blood field.

As I noted, we started a cord blood banking program. We now have cord blood banking taking place in several places. I hope people are doing more of this across the country. As I stated, we have distributed nearly 10,000 units of this to get to matches in various places, in various individuals across the country. We need more cord blood donated because you have to match a series of six factors and at least four of those factors must match to be able to use the cord blood in a particular individual such as Keone. Therefore, you need to have a broad cross-section of cord blood in the banking supply so people can possibly find a match.

In many places it has been used as a substitute for bone marrow and the difficult collection process that takes place sometimes with marrow. We need more in the cord blood field so we can get more people treated like Keone Penn. I think that is a key avenue for us, in stem cell work, in producing the results.

Next step, the next field we need to go to is amniotic fluid. I want to show this to my colleagues. Some of them would have seen this issue. We started a cord blood banking program to get this, so we could get more matches across the country and could get a broader cross-section of individuals who have contributed from various types of blood so we could get matches.

The next area we need to bank in, I believe, is amniotic fluid. The fluid that surrounds the child as the child is in the womb is also a rich source of stem cells. It would be my hope that in this year's appropriations bill we would not only study, I hope we will begin the collection and funding of collecting amniotic fluid.

Now I urge my colleagues on all sides of this issue to say: Here is another one we can agree upon in moving forward in the stem cell field. I wanted to cite to this, because it is an exciting breakthrough of news.

This article appeared in JAMA, Journal of American Medical Association, February 28 of this year, on amniotic fluid. Amniotic fluid-derived stem cells can be coaxed to become muscle, bone, fat, blood vessels, nerves, and liver cells. It might be capable of repairing damaged tissue resulting from conditions such as spinal cord injuries, diabetes, Alzheimer's disease, and stroke.

My reason for pointing this out is this is one we can agree upon. This is one we can move forward with. The amniotic fluid is discarded after the pregnancy, is not collected. It can be collected. It could be collected. We should see about collecting this and move forward on these treatments, and some of the $613 million we spent on embryonic stem cell research could go into this field, and likely you are going to be producing results very quickly. If the amniotic fluid some people are talking about, as well as the placenta, being able to collect stem cells from the placenta and other rich sources of stem cells—if we can take some of this $613 million that has produced zero human clinical trials to date and put it into fields that are producing or have a high potential here in a near-term basis to be able to produce treatments or possibly even cures—no ethical problem, no ethical issues; this would be clearly a key one to go forward with.

I also want to further develop the thought about embryonic stem cells leading inevitably to human cloning. I want to put out some numbers on this, follow with the discussion on this. People certainly will understand it. If we are to collect and develop additional embryonic stem cell lines, we get these embryos from IVF clinics around the country, and you start these lines, the genetic match will not take place. That genetic material will not match anybody, because it is unique genetic material, so as soon as it is implanted into somebody else, there is going to be a rejection by the body taking place. That individual is going to have to be on immunosuppressive drugs for the remainder of their life, because the body is rejecting this foreign material.

Therefore, the answer is to move forward, saying, well, okay, we have developed this science, we can do human embryonic stem cell work, it works, but we are getting the rejection taking place. Therefore, we are going to need to do human cloning, but it is not going to be real human cloning, it is going to be SCNT—somatic cell nuclear transfer, that is the scientific name for human cloning—and we are not going to clone, because we will create the clone, we will harvest women's eggs, we will then create the clone, and we are not going to allow the implementation of it. Therefore, we can say it is not cloning because it is not going to result in a full-scale child, by all definitions. We are going to clone a person, we are going to start human life, then we are going to purposefully kill it for its stem cells, that genetic match.

That is the process this will inevitably lead to if we are successful in this science that I believe highly doubtful, given the tumor formation. But let's say we are successful in the next couple of decades, we can develop the science, the tumor issues somehow we are able to deal with, over that period of time, we get over that hurdle, we can develop it.

We have an immunosuppressant problem, so therefore now we have got to move into human cloning. Where do we get those human clones? We get them from people. We have to have an egg we get from women. We will get the genetic material from the person who needs the embryonic stem cells; that is not a problem. But we are going to have to harvest a lot of eggs.

I want to go through some of those numbers from different individuals who have looked and thought about this. I would hope my colleagues, even if they are on the other side of this, would think about where does this take us, which is a real question about the idea of doing massive amounts of human cloning, massive amounts of harvesting of women's eggs to do human cloning that is going to take place. Because you do not get a one-for-one match, you get the one human egg, you are not going to get it to necessarily take as a human clone, it is going to take a number of attempts to take place—I believe the numbers I have heard are somewhere around 200 eggs are necessary to get one clone to take.

Now, maybe we are able to develop that technology better into the future. But if we develop this line, you are probably going to look at the need for hundreds of thousands, if not millions, of embryos needed to pursue this speculative embryonic stem cell research. And for this application, you are going to need millions of eggs and millions of human clones—excuse me, I cannot call them clones—SCNT products, that is the scientific name for human clones, SCNT clones. These embryos are going to have to be developed that way to obtain sufficient embryos for this speculative research science, that will turn to human cloning, which will exploit women for their eggs, because where are we going to get hundreds of thousands of eggs? Are we going to have women in this country be willing to voluntarily go through the process, a difficult process? It can be damaging to their bodies.

Maybe we will get some to do that. Probably more likely we will be going abroad to recruit people to give eggs. It is unlikely they will give them, it is more likely they will be paid for those eggs to take place, and to go through this difficult, painful, and potentially harmful problem.

Is that the route we want to go, or would we be wiser to work with amniotic fluid, the cord blood, the placenta collection that is taking place,

and take some of this money and develop that field? I think the route forward is pretty clear.

I also want to discuss the idea we were talking about, a disposable medical infrastructure, the frozen embryos. I want to put back up a chart of one of those embryos we have here, and talk about this from a standpoint. I ask my colleagues to think about this for a second.

I believe everybody is wrestling with the notion that the human embryo is alive. We all agree it is alive. Some of us will give it the status of a life; others would not. Others would call it a potential for human life. I do not believe that is the scientific term, but some would call it a potential for human life.

It is a human embryo. Here is a picture of a human embryo. That is actually a child who was adopted as a frozen embryo and implanted and grew. This is, of course, what we are looking at as a physical entity. It is human. It is in the human species. We know that. All of us are having some level of difficulty with using taxpayer funding to destroy that young human life. Well, why are we having that level of difficulty with destroying something that looks like this? I think it is because in our own being, and the natural law that resides in each of us, we believe in dignity for every human being, period. We believe everybody who is here, who is listening or watching this, is a dignified person and worthy of respect and worthy of recognition as a person. That is why when we have people on death row and facing execution, we do not say, let's go and harvest their organs. When we hear that term, we are appalled by it, because we are saying: That is wrong.

Well, why? Because the person is going to die. They were convicted of a heinous crime. Why not harvest their body parts and save some lives? Because we certainly could. That way we could save a number of lives by harvesting the organs of a person who committed a terrible crime. They are guilty. Despite the number of people having difficulty with the death penalty—and I have difficulty with the death penalty—why wouldn't we go ahead and harvest the organs? We are going to throw them away, right? We are going to dispose of them, right?

Well, but something within us says, that doesn't feel right; that seems as if that is the wrong thing to do. And it doesn't seem as if it is right because it is not the right thing to do. It violates their human dignity, that individual, even though they have committed that crime, is a dignified human being and worthy still, even though they have committed the heinous crime, is worthy of us treating them with some level of respect, and not harvesting their organs. If they decide to voluntarily give them up, that is their choice, but they are worthy of that respect. So why, when we are looking at human life here, that all of us agree is human, alive, would we say: Well, callously, we can throw them away because they do not look like us.

Well, the child at this stage starts to look like us, but it is pretty small. You can say it doesn't look much like us. Can we do it at that stage too? Then if we are uncomfortable with doing it in the early phase, or we are comfortable with doing it in an earlier phase, or when Hannah is born, can we research on her then? She cannot do a whole lot at that point in time for herself. If we leave her by herself, she will die. She can't care for herself at that point in time. So why not research on her at that point? Well, no, because she is a dignified human. So, okay, she is here. At what point? Here? Probably so. At that point? Here?

Well, I don't think so. I agree she is human. I agree she is alive, but I am not willing to give her any dignity status as a human.

What divides those? Some would say place, placement. If it is placed in a womb, it is. If it is not in the womb, it is not. Location has not determined personhood in our past. I would suggest it doesn't determine it in our future or presently. There is a natural revulsion toward this idea that we would take life from somebody for their body parts for somebody else, and here we are having difficulty saying, well, yes, but the possibilities are so promising we are going to go ahead and do it anyway.

I quarrel with the possibilities being that promising, and I have gone through this at length with my colleagues and discussed that. Even if it were, what about the human dignity of each of us? When we have an alternative that is working, and when we have more possibilities we can fund in the amniotic fluid developing, and the placenta research, why not go those avenues, where we are actually getting some possibilities, we are actually getting people treated, and we have no ethical questions, and we can go forward aggressively and happily about it?

I am pro-life and whole life. I believe life is sacred. I believe life is sacred in the womb and I believe life is sacred wherever it is. I believe a child in Darfur is sacred, I believe that person even on death row is sacred, and should be treated with dignity. I believe the youngest phase that people are is sacred and should be treated with dignity. I do not think we have to go there. And if we do go there, it leads down a path we do not want to follow in human cloning, and that we should agree with as a society.

Mr. President, I want to also note to my colleagues we can spend a lot of time on this bill. I do not believe it is going to become law because of the divide in this country, because the President is going to veto it. We will see if there are votes to sustain that veto or to override that veto. I do not think this is going to become law. So why would not we then look at this as a chance for us to work together on areas that we know have high potential for cures and treatment and that unite us? There are plenty of things that divide us. There are clearly things in areas that unite us, there are clearly future areas of things that we can work on to unite us and to provide cures. Why would that not be a better approach? Are we so locked into a division here that we cannot find a way forward? I would submit we can find a way forward, and that we can work on these topics and provide cures so none of us is the poorer for it. We are moving forward. Unfortunately, too much of the work is happening overseas in the adult stem cell work and our people are not getting good access to it. I have cited several examples—that should not be happening overseas; it should be readily available here—of treatments that are developed here but are actually being practiced in places overseas because of either lack of interest or support that we would have here. I urge my colleagues to vote against S. 5. I urge my colleagues to work with me and others on developing this promising field in amniotic fluid. I urge others to work with me as we work in the areas of adult stem cell and cord blood that are currently treating and curing people and that we can do more of that and we can do that together and happily together and unite our country on an important topic instead of constantly dividing.

I yield the floor.

The ACTING PRESIDENT pro tempore. The Senator from Michigan.

Mr. LEVIN. Mr. President, are we operating under a UC at the moment?

The ACTING PRESIDENT pro tempore. We are operating under consented time. The Senator from Iowa controls 90 minutes.

Mr. LEVIN. I have been authorized to yield myself 10 minutes.

The ACTING PRESIDENT pro tempore. The Senator is recognized.

Mr. LEVIN. Mr. President, in the previous Congress, the Senate and the House of Representatives voted resoundingly to lift the President's burdensome restrictions on embryonic stem cell research. The President, however, used the first—and so far only—veto of his administration to reject this potentially life-giving research which is supported by a clear majority of the American people. We are here today to try again to give our scientists the tools they need as they work to cure some of the most debilitating and dreaded diseases. We will not—and we should not—yield until we remove the obstacles the President has put in their way.

This fight is critical, because embryonic stem cell research could hold the key to curing diseases that no other research could cure. As best we know now, an embryonic stem cell is unique in nature. It alone can develop into any other type of cell in the body. Embryonic stem cells—and embryonic stem cells alone—can become a nerve cell, a muscle cell, or any of the more than

200 types of cells in the body. The promise of this unique ability is clear: If scientists could replace diseased cells with healthy cells created from embryonic stem cells, it could save an untold number of lives.

For example, Parkinson's disease is a motor system disorder that results from a loss of brain cells that produce dopamine. Individuals with Parkinson's disease often experience a trembling in the hands, arms, or face, and impaired balance and coordination. As the disease develops, it can become difficult to walk, talk, and complete other basic tasks. With research, scientists may be able to coax embryonic stem cells into becoming healthy neurons that produce the desperately-needed dopamine. If those neurons can be successfully transplanted into a patient with Parkinson's disease, that person could be cured.

The list of diseases that could benefit from stem cell research is long—Alzheimer's disease, Lou Gehrig's disease, juvenile diabetes, spinal cord injuries, and many others. Stem cell research could offer the millions of Americans suffering from these diseases not just hope but cures.

Supporters of stem cell research understand that these breakthroughs will not be easy or inevitable. But the President's policy makes them far less likely. On August 21, 2001, President Bush issued an executive order that the Federal Government would only fund embryonic stem cell research on stem cell lines created before that date. ''Stem cell line'' is the name given to constantly-dividing cells that continue to be derived from a single embryo.

Most independent experts estimated at the time of the President's executive order that about 80 stem cell lines—a woefully inadequate amount—would be available for Federal research. Most of those lines were later determined to be polluted and unusable, leaving only about 20 stem cell lines available.

Last month, the Director of the National Institutes of Health, Dr. Elias Zerhouni was asked during testimony before the Senate Appropriations Subcommittee on Labor, Health and Human Services, and Education whether ''scientists have a better chance of finding new cures [and] new interventions for diseases if the current restriction on embryonic stem cell research were lifted.'' Dr. Zerhouni responded: ''these cell lines will not be sufficient to do all the research we need to do . . . these cell lines have exhibited instability from the genetic standpoint and it's not possible for me to see how we can continue the momentum of science in stem cell research with the cell lines that we have currently at NIH that can be funded. It is clear today that American science would be better served and the nation would be better served if we let our scientists have access to more cell lines.''

In issuing his executive order and in vetoing the bill we passed last year, the President did not question the scientific possibilities of stem cell research. In fact, he said the opposite. He stated in 2001:

> Scientists believe further research using stem cells offers great promise that could help improve the lives of those who suffer from many terrible diseases.

The President's objection is to using embryos for research. But the key fact—and one that opponents refuse to deal with—is that any embryo not used for stem cell research is going to be destroyed anyway. The embryos created by fertilization clinics that are not going to be used for implantation will be destroyed. Why not give them a life-giving use then? No answer has been forthcoming from the President.

RAND Health conducted a study in 2003 that found there were approximately 400,000 embryos in storage in the United States and some of these embryos will never be used because parents either had a successful pregnancy and no longer need them or because treatments were unsuccessful. In addition, the study found that only 2 percent of these embryos will be used to create pregnancies in unrelated mothers. Many will be discarded.

Last year, the Detroit News editorialized against a Michigan law restricting embryonic stem cell research and used words that apply equally well to the President's policy. The News wrote:

> The justification for this law is to protect human embryos, but the fact that fertility clinics can simply discard them means that the research ban is pointless.

Sean Morrison, director of the University of Michigan's Center for Stem Cell Biology and one of the country's leading stem cell researchers, agrees. In an article in the Ann Arbor News last month, Dr. Morrison stated:

> The thing about that that's crazy is human embryos are discarded all the time by fertility clinics . . .So it's legal to throw them away, but it's not legal to use them to try to help somebody.

Embryonic stem cell research is truly a life-giving process because of the extraordinary potential for healing living, breathing human beings, human beings with names and faces and families.

Members of the House of Representatives have now passed the bipartisan Stem Cell Research and Enhancement Act, H.R. 3. After we debate the companion bill, S. 5, I hope we too will again adopt it and remove the President's arbitrary prohibition against funding stem cell research on embryos. It will pave the way for hundreds or thousands of additional stem cell lines to be made available.

This bill has the strong support of the American Medical Association, the Coalition for the Advancement of Medical Research, the Association of American Universities, the Christopher Reeve Foundation, the Juvenile Diabetes Research Foundation, the Leukemia and Lymphoma Society, the Parkinson's Action Network, and more than 500 additional organizations. More importantly, it has the overwhelming support of the American people. If the President again vetoes this bill, I hope Congress will override that veto.

As part of the unanimous consent agreement to consider this legislation, we are considering an additional bill as well. Senators COLEMAN and ISAKSON introduced a bill that promotes stem cell research limited to those stem cells obtained from ''naturally dead'' embryos. These embryos are called ''naturally dead'' because they are unable to divide and reproduce like other embryos. While we should pursue all types of research, I do not believe we should limit stem cell research to stem cells that may be flawed, as indicated by their inability to reproduce and divide.

Embryonic stem cell research holds enormous promise for healing and saving individuals who suffer from debilitating diseases and injuries. It is our responsibility to pursue those cures and treatments in an ethical manner. In order for our scientists to do quality research and make advances in medicine, they must have access to embryonic stem cells that are uncontaminated and viable for research, especially since they will otherwise be destroyed. S. 5 will allow our scientists to move forward to a new generation of potentially life-saving cures. It deserves the support of this body.

I yield the floor.

Mr. BINGAMAN. Mr. President, I yield myself 5 minutes from the time reserved on Senator HARKIN's side.

The ACTING PRESIDENT pro tempore. Without objection, the Senator is recognized for 5 minutes.

Mr. BINGAMAN. Mr. President, I rise in favor of S. 5, the stem cell enhancement bill of 2007. Many of my colleagues have eloquently stated reasons for supporting this bill over the past 2 days. The passage of this bill would be an important step forward for research into treatments of devastating diseases. In addition, passing S. 5 will help the United States as a leader in biomedical research, a leader in transparent and ethical research practices, and a leader in developing safe, effective treatments for diseases. I wish to see stem cell therapies developed in this country so we can ensure the safety and availability of these treatments for American families and at the same time create jobs for highly skilled workers to do the necessary research and to develop these new treatments.

Our current policy puts us at a severe disadvantage to other countries. As the Director of the NIH said at a recent hearing, our current stem cell policy is akin to working with one hand tied behind our backs. Scientists in most other countries are at an advantage to U.S. scientists because they are allowed to study the best stem cell lines and do so with government funding.

Let me explain this world stem cell policies map I have put up. It is color coded to show the different stem cell policies that exist in different parts of

the world. We have essentially chosen four colors or four categories of policies I am trying to focus on. First, we have the countries in yellow which have not adopted stem cell policies. You can see those countries are fairly extensive. Next to those are those that have adopted stem cell policies. The United States is part of that group. Those are the countries in gray on this world map. The United States is among the most restrictive of those countries that are in gray, but we do have other countries that have policies that are in that category as well.

Third are the countries in light brown which allow the creation of stem cell lines from leftover embryos in IVF clinics. We can see those light-brown countries. Passing S. 5 would move the United States into that group of countries, such as France and Canada and Brazil.

The final group depicted on this world map is those that are shaded in dark brown. These countries allow other laboratory techniques to be used to create embryonic stem cell lines. You will notice that many of these countries have very strong scientific research programs. I particularly mention the United Kingdom, India, and China as part of that. Scientists in these countries, other than the United States, are free to use the type of stem cells best suited to their research, whether they are adult stem cells or embryonic stem cells created before 2001 or embryonic stem cells created after 2001. In fact, many countries have been promoting stem cell research because they see this as an opportunity to get ahead in this field during a time when U.S. scientists are restricted to less useful stem cell lines.

For example, the United Kingdom has established a world stem cell bank to collect, characterize, and distribute embryonic stem cell lines to researchers around the world. The United Kingdom has also developed a comprehensive national regulatory system that requires researchers to follow strict ethical guidelines. While these regulations may slow research to some extent, embryonic research is an area that merits extra care and transparency and oversight. We should not relinquish our duty to uphold high ethical research standards to other countries or to individual States within this country or to the market more generally.

I ask unanimous consent for an additional 2 minutes.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered. The Senator is recognized.

Mr. BINGAMAN. Many other countries, including Singapore, Korea, and Australia, also have federally funded centers for embryonic stem cells. However, it will be difficult for the United States to capitalize on the research advances that are made in these other countries since federally funded scientists in the United States are restricted from collaborating with foreign scientists who use the stem cell lines that were generated after 2001.

Furthermore, we can't leave this important field of science to the private sector alone. We have a long history of bipartisan support for basic science research in this country precisely because it does not make financial sense for industries to invest substantially in early-stage research. Any scientist will tell you that human embryonic stem cell research is still in its early stages, and that it has gone more slowly than it would have otherwise gone because of the restrictions currently in place in our own policy. Furthermore, most cell-based therapies, including bone marrow stem cell transplants, were first developed in academic research hospitals and have never been widely utilized. This means Federal funding is even more important for cell-based therapies such as stem cell transplants than it is for other types of treatments.

Mr. President, I urge my colleagues to support S. 5. It is an important step to keep the United States a world leader in the field of biomedical research, and it will give hope to many of our citizens for the treatments they desperately need.

Mr. President, I yield the floor.

The PRESIDING OFFICER (Mr. SANDERS). The Senator from Maryland.

Ms. MIKULSKI. Mr. President, I rise today to speak with some great urgency on the need to pass the Stem Cell Research Enhancement Act of 2007, S. 5.

We must pass this bill because if we do not, the American people will continue to suffer, our brilliant researchers will be discouraged and think about leaving the field of scientific research and, No. 3, we are also outsourcing our intellectual capital because other research is going overseas.

We have to have a sense of urgency because stem cell research takes a long time. We cannot have science on demand or scientists on demand. If we do not act now, we are going to be discouraging very important research and wonderful young people from going into this field.

Every year we wait, we fall 3 years behind in our research—another time where a patient might have been saved, a family might not have had to watch a loved one suffer, and also where we would not have to watch our great ideas going somewhere else.

Stem cell research is very important to the American people. It is very important to Maryland. It is very important to me. I am a firm, clear, unabashed supporter of expanded stem cell research and, at the same time, that this research be conducted under the strictest bioethical standards. That is why I like S. 5. This legislation is based on sound cellular biology science and also good, sound ethical principles.

This legislation is so important not because legislation is important but because it opens more opportunity to do stem cell research. What does that mean? It means that currently the existing law under President Bush restricts stem cell research to adult cells, to some vague 21 lines that are becoming tired and toxic. But under our legislation, it would open it up to embryonic stem cell research where embryos are garnered that are discarded in in vitro processes in which the donors themselves have to make that informed choice.

What does this do, though? Well, I will tell you, stem cell research is the kind of research that could find a cure for Parkinson's disease, diabetes, diseases of the brain and the immune system, multiple sclerosis, and spinal cord injury. Imagine if scientists could find a cure for Alzheimer's or Parkinson's, or if they cannot find a cure, to be able to regenerate new kinds of brain cells to give people a cognitive or functioning stretchout. Think about the impact on families, but also think about the impact on our nursing home budget.

Think about research in juvenile diabetes, type 1 diabetes, where little children, every day—whether they are 5 or 9 or 11—have to be testing their blood sugar. They cannot eat the way other kids do. They have to watch how they pace themselves when they play ball or do other things so they do not induce hypoglycemia. As they get older and their cells get even more tired, they fear they could lose a kidney or lose their eyesight.

If we could find more breakthroughs in juvenile diabetes, we would give them their childhood back. We would give them a life that has a future full of promise. That is why we are fighting here. It is not about ideology. It is not about party. It is about our American people. And what we invent here could help save lives everywhere.

Yesterday, I went to Johns Hopkins University to discuss this stem cell research. I wanted to be sure I was on the right track: sound science, good, solid ethical frameworks. I said to the scientists: Tell me what you are doing and tell me what impedes you now working under the Bush framework?

Well, they gave me an earful. First, it is inspirational—inspirational—in what they are doing in pediatric leukemia, in juvenile diabetes, in multiple sclerosis. Also, to give an example, in talking to Dr. Doug Kerr, he is working now through stem cells—yes, it is with paralyzed rats—to not only regenerate the spinal cord but to have those cells connect to muscle so not only for whether you are regenerating spinal cords that have been injured or severed, but also to connect the muscle so you could walk again. That was the dream of Christopher Reeve. But that is the dream of every paraplegic right now—whether it has come from a diving accident, if you are an athlete, or whether you have been injured in Iraq or Afghanistan.

Don't we want Dr. Kerr to do what he is doing now and to be able to extend that? But they do not get the clinical

trials because they are restricted in the types of cells they can use.

So we saw a cornucopia, again, of opportunity there. But I said to the docs at Hopkins: Why can't we do this with private or State funds? They said: Senator MIKULSKI, you have to have a national framework. First, that is where you get your bioethical guidelines. It is done not while there is one set of guidelines for States that can afford research and that there is another set of guidelines for those States that can't. Also, there is not enough in private philanthropic funds to be able to do this.

Private funds function like venture capital. But at the same time, what happens with States? Maryland is now in a bidding war with our $25 million against California. We have scientists who are leaving Maryland to go to California. Hats off to them. But also, then, we have scientists in Maryland and California who are leaving the country because they can do work in Sweden or Singapore that they cannot do in their own country. These are American scientists who want to do their own work in their own country. But we are driving them out with our narrow-minded ideological sense of politicizing science.

So we cannot do this with State funds, and we cannot do it with private funds. As I said, right now we are outsourcing this to China, to Singapore, to Australia, to Germany. I am not saying there are good countries or not good countries, but what are we doing? We are losing our intellectual capital. We are also losing our young scientists.

Yesterday, I talked to a young doctor. I knew him as a resident. His wife was a friend of a friend of mine. I knew him through his residency. Now he is a young doctor, married, with three children. His whole field is diabetes. He is so eager to do this juvenile diabetic research. He has already started it. He is already good at it. Gosh, maybe he could win the Nobel prize one day. But guess what. There is not the money for the young scientist. Also, with the very shackling of what goes on now in these so-called Bush lines, with these ideological guidelines, they cannot do the research. He has to think hard about whether he wants to continue his life dream of finding a cure for juvenile diabetes.

You see, this man has devoted his life to getting ready to do this, and now his own Government is stopping him—not because he is not smart, not because we do not have the will, but because we have too much ideology and too little money in the wallet.

We have a President who has given us a framework where research has one hand behind its back. Scientists have been prohibited from doing new stem cell research.

Six years ago, the President restricted Federal funds for embryonic stem cell research. What did it do? It created an unregulated atmosphere. The result was federally funded stem cell research was halted almost entirely. Stem cell research was done by private entities. A private entity has no Federal bioethical standards.

Mr. President, like you, I am a sunshine person. I believe you should have research conducted in the sunshine. That is where you have compliance with bioethical standards. That is why we need to have the kind of national framework where everybody goes by the same rules, at the same time, in the same way. Without national standards, research will be done by the well-heeled, outside of the public eye, with no national scrutiny. This is where I fear dark and ghoulish things can occur.

I acknowledge the validity of some of the concerns raised by colleagues. But as long as you shove it underground, as long as you shove it behind closed doors, then you are going to get either faulty research or very bad ethics.

I believe the legislation pending will remove the restrictions imposed by the President. It will provide the ethical and medical framework we need for federally funded stem cell research. It will create strong ethical guidelines. Most of all, it will ensure that we now open the opportunity for even greater and more expanded stem cell research so scientists will now have access to new, fresh stem cell lines which they now do not.

What does it mean? Well, I can tell you what it means. It means for the United States of America we have heard what the voters said in November. They said: Change the direction of the country. Change the priorities. Come back home, America. Remember what America is. We are the land of the free, the home of the brave, and of discovery. Let's go for it.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Iowa.

Mr. HARKIN. Mr. President, I thank the Senator from Maryland for her very eloquent statement and for her strong support of hope and health and healing, as encompassed in S. 5.

Mr. President, while I wait the arrival of our next speaker, I want to point out that time and time again I hear those who are opposed to S. 5 use the phrase that they are opposed to funds being used for the destruction of embryos. Earlier today I had corrected one Senator who said that. I said: Show me in the bill where it is. Well, then other Senators—the Senator from Kansas and others—have gotten up and talked about not using money for the destruction of embryos.

I challenge anyone, any Senator to come and take S. 5 and show me anywhere in there where there is one dime used for the destruction of embryos. It is not there. I get the feeling that a misrepresentation repeated and repeated somehow seems to take hold so that people say: Well, there must be money for the destruction of embryos in this bill. There is not. That is covered by the Dickey-Wicker amendment which pertains to appropriations bills, and I am an appropriator, and that is covered there. So none of this money is used for the destruction of an embryo. All it is used for is for the research on stem cells that have been derived, which is what is being done today, by the way—which are derived. Now, those derivations can come from private entities or State sponsored or wherever, maybe some international, maybe foreign countries—wherever. But none of the money here in our bill, S. 5, can be used for the destruction of an embryo, period. If anyone says so, please come and show us where it is in the bill that says that.

Mr. President, I see the distinguished Senator from Missouri is here. I yield 15 minutes to the Senator from Missouri.

Mrs. MCCASKILL. Mr. President, I rise to speak today on a matter of significant medical, scientific, and personal importance. Today, my colleagues and I have the opportunity to support research which will result in lifesaving cures, research which alleviates pain and suffering, and research which improves the quality of life of millions of Americans. I am speaking about research which will provide some of the most significant medical advances we have ever seen in the history of mankind.

Of course, I am speaking in the strongest support of S. 5, the Stem Cell Research Enhancement Act. I thank my distinguished colleagues, Senators HARKIN, HATCH, KENNEDY, and SPECTER, for the leadership they have offered on embryonic stem cell research legislation over the last several years.

In my short time in the Senate, I have had the occasion to speak and vote on numerous matters of significant national importance, but not every day do we have the opportunity to vote to heal the sick. Today, we have a chance to set aside partisan politics and support legislation that aims to improve the quality of life for tens of millions of Americans. It is a noble cause and one that reminds me of how proud I am to represent Missouri in the Senate.

Who would oppose such a cause, and what would their reasons be for such opposition? The opponents of embryonic stem cell research attack it on multiple fronts—public opinion, scientific fact, and moral grounds—and the war against embryonic stem cell research is fought in our communities, in the media, and today in this Congress. Unfortunately, the casualties are the medical researchers and doctors who want nothing more than to cure diseases. That is all they want. They have no grand scheme. There is no big money here. We are talking about curing diseases. Ultimately, the casualties are the patients who would benefit from those cures.

My greatest disappointment in this debate has been the numerous inaccurate statements made in this Chamber by opponents of embryonic stem

cell research. Because this issue was on the ballot in Missouri last year, I had the opportunity to learn a great deal about this field during the months we campaigned for the U.S. Senate, as this issue was debated in great detail across my State. Let me talk about a few of the misrepresentations that have been made in this debate.

Claim: Adult stem cell research and stem cells derived from umbilical cord blood and amniotic fluid are adequate and we don't need embryonic stem cell research and there are 72 adult stem cell treatments for human diseases. The truth: In the medical journal Science, July of 2006, Dr. William Neaves of the Stowers Institute for Medical Research in Kansas City and Dr. Steven Teitelbaum of Washington University Medical School in St. Louis detail that this false claim originates from David Prentice of the Family Research Council. Mr. Prentice asserts that there were over 1,000 ongoing clinical trials of adult stem cell therapies. A review of the record at the NIH Web site that tracks clinical trials, however, showed that Mr. Prentice grossly misinterpreted the data. He searched the database for any entry containing the word ''stem'' and counted items such as ''brain stem,'' ''system,'' and ''stem from,'' which is a verb. There were numerous other errors and omissions that served as the basis for this claim. In fact, there are only a handful of clinical trials with adult stem cells, and only nine conditions have adult stem cell treatments that are approved by the FDA.

In addition, as the Senator from Iowa so eloquently outlined yesterday, most scientists and patient advocacy groups agree that adult stem cell research is not a substitute for embryonic stem cell research. All research is good, but we cannot substitute an inferior form of research for the type of research that holds the most promise for these elusive cures.

Many organs do not have adult stem cells, and adult stem cells and cord stem cells are not pluripotent. That means they don't have the ability embryonic stem cells do to develop into any type of cell, and therefore their use is limited.

Claim: Tumors are a necessary product of implanting embryonic stem cells. The truth: Tumors will only develop if undifferentiated stem cells are injected into mice. Undifferentiated cells are those which have not developed into their final state. For example, a cell that has not developed into its final state is a blood cell or a bone cell or a nerve cell. In fact, tumor formation is exactly how scientists determine that a cell is pluripotent—in other words, able to develop into a multitude of different types of cells. However, nobody is suggesting that undifferentiated stem cells be injected into humans. The FDA has monitored this question, and there is no evidence that cells differentiated from embryonic stem cells cause tumors.

Claim: The 21 viable embryonic stem cell lines we have currently funded are plenty. It is sufficient. The truth: As Dr. John Gearhart told the Committee on Aging, the federally approved lines are not genetically diverse, meaning we don't have the cell lines needed that will allow us to fully utilize this vital research. Importantly, minorities are the greatest affected group due to the lack of genetic diversity in these cell lines. In addition, many of the federally approved lines are contaminated with mouse feeder cells. Finally, some of these cell lines are involved in proprietary arguments and are not available for research purposes. Asking America's scientists to work with only 21 viable embryonic stem cell lines is hamstringing them and impeding this important progress.

Claim: This legislation will use tax dollars to fund destruction of human embryos. The truth: Each year, Congress attaches the Dickey-Wicker amendment to the Labor-HHS appropriations bill stating that no Federal funds can be used to destroy human embryos. That has not changed. This bill simply allows Federal funds to be used to study stem cell lines that are derived from human embryos that otherwise would have been discarded. How many times do we need to say it: ''that otherwise would have been discarded.'' Not a dime of Federal money will fund the destruction of human embryos.

Claim: If embryonic stem cell research was such a promising field, it should have produced hundreds of cures by now. Over 30 years of research into embryonic stem cells has proved fruitless. The truth: The first of human embryonic stem cells were not isolated until 1998, and research with embryonic stem cells was not awarded Federal funding until 2002. That was only 5 years ago. To put this in context, from the first research into a vaccine for polio, over 20 years passed before doctors first developed the first effective polio vaccine. Hundreds of Nobel laureates agree that embryonic stem cell research has great potential for developing cures, but this will take both funding and time. The NIH has provided over half a billion dollars each year in Federal funding for stem cell research since fiscal year 2003, but only a small fraction of those funds has gone to embryonic stem cell research.

Claim: There are inadequate ethical guidelines in S. 5. In fact, this proposed legislation has tougher ethical guidelines than those which currently exist. This legislation provides the ethical framework we need for this legislation. This proposed legislation makes sure that, first, the only embryos that can be used are those which are created for fertility treatments and which are in excess of the clinical need and would be discarded; second, there must be written, informed consent from the donors; third, donors can receive no financial reward for their donations.

These two facts are important to me as I listened to the misinformation about the way we are going to subject women to egg-harvesting and this rampant practice of selling eggs on the open market. Both of those things are prohibited in this legislation. Donors cannot receive financial reward for their donations, and it has to be only eggs that would otherwise be discarded.

Fourth, the Director of the National Institutes of Health must issue guidelines 60 days after the enactment of this legislation.

Finally, it is interesting to note that some of the 21 stem cell lines that are currently being used for embryonic stem cell research might not even meet the strict guidelines that are contained in this legislation.

Families all across America are using medical research to participate in the miracle of birth.

Fact: The process of using medical research to enhance the likelihood of pregnancy produces an excess of eggs. I have heard no claims to the contrary because that is the fact.

Fact: Thousands of these eggs are going to be destroyed. I have heard a lot of claims in this Chamber, but no one is arguing with a straight face that the process of producing eggs for in vitro fertilization does not produce thousands of excess eggs.

Fact: Thousands of these eggs are going to be destroyed. It is just that simple.

Here is the question. This is the question of the day: Is it better to use these eggs to save lives as opposed to throwing them away? It really boils down to that. Ultimately, if some of our colleagues say it is wrong to use these eggs to save lives, then surely these same colleagues must believe it is wrong to throw them away. Where is their legislation outlawing their destruction? In other words, where is their legislation outlawing in vitro fertilization? Because inherent in that process is the destruction of human embryos.

I come from Missouri, where we say what we think and we mean what we say. Two of Missouri's finest and most respected leaders have spoken quite eloquently on the subject of embryonic stem cell research.

Senator John Danforth, a former Republican Member of this body, strongly supported the stem cell initiative that was put successfully before voters in Missouri in 2006. An Episcopalian minister, Senator Danforth voted many times in this Chamber as a Senator who believed that abortion should not be legal in this country. An Episcopalian minister, Senator Danforth has also worked through the moral and ethical issues he had with embryonic stem cell research. When asked about the equality of a multicelled embryo in a petri dish and the life of a human child suffering from a debilitating disease, he put it in context by asking simply: If a house were on fire and you had to make the choice, would you rescue a petri dish or a 3-year-old child?

Doctor William Neaves is the president of the Stowers Institute for Medical Research in Kansas City, one of the finest research institutions in the Nation. One of the most spiritual and thoughtful men I have known, Dr. Neaves has studied the moral and ethical implications of in vitro fertilization and stem cell research over the last 25 years with his wife, who is also a bioethicist and an ordained Methodist minister. He struggled with his position on these issues due to his faith and upbringing, but in the end, upon reflection and studying the Bible, he concluded that embryonic stem cell research is morally and ethically acceptable.

I will close with Dr. Neaves' words:

Two elements have been pivotal in forming my belief. The first is the biological fact that in normal human reproduction, most blastocysts, or embryos, perish rather than implant in the uterus. The second is Ecclesiastes 11:5 in the English Standard Bible:

As you do not know the way the spirit comes to the bones in the womb of a woman with child, so you do not know the work of God who makes everything.

Many people of faith believe that research with embryonic stem cells represents a perfectly moral means of fulfilling the biblical mandate to heal the sick. Other people of faith disagree. Should Federal policy disqualify a field of research from competing for Federal funds because some Christians object to it? As a Christian who supports this research, I certainly hope not.

I yield the floor.

Mr. HARKIN. I thank the Senator from Missouri for a very eloquent and poignant statement. I know the Senator mentioned that recently she came off a campaign in Missouri. I know that, in listening to her statement, she is reflecting the wishes and hopes of so many people in her own State who want to make sure we move ahead and find cures and treatments. I thank her for her eloquence and for her forthright statement on behalf of embryonic stem cell research.

Mr. President, I now yield 10 minutes to the distinguished Senator from Colorado.

The PRESIDING OFFICER. The Senator from Colorado is recognized.

Mr. SALAZAR. Mr. President, I rise today to discuss the question currently before the Senate regarding whether to allow Federal funding for embryonic stem cell research. Let me start out my remarks, first, by acknowledging Senator HARKIN and the great work he has done in this field. It is beyond a doubt that he is an expert on embryonic stem cell research, one of our national leading experts in terms of health care, and having been an advocate in that area, he is recognized across this country. I admire his work on this legislation, as well as the work that has been put into this legislation by a number of colleagues, including many on the Republican side of the aisle who have joined this bipartisan coalition to make stem cell research a reality for the people of America.

At the end of the day, S. 5 is about hope—about hope for over 1 million Americans who today suffer from the trembling caused by Parkinson's disease. It is about hope for the over 1 million people in America who suffer from Alzheimer's disease. It is about hope for the 17 million Americans who suffer from diabetes, including the hope that we should be giving to those young people who are suffering from juvenile diabetes and have to look at a life of dealing with the difficulties of that illness. It is about hope for the more than 64 million Americans who today suffer from one or more forms of heart disease. So the debate on the floor today is, in fact, about the hope and aspirations of all Americans, including people, many of whom are related to Members in this Chamber today.

Scientists in America agree that, without a doubt, embryonic stem cell research holds great potential for curing these and other diseases. It is remarkable that against the conclusive determination of the scientific community, we have the Federal Government in a position where it is actively withholding the financial support that is needed to carry on this very important research for America. That is not the American way. The American way is to open new doors of hope. We ought to be opening new doors of hope as well with the passage of this legislation later today.

The reason that scientists are so excited about the potential of embryonic stem cell research—and the reason that this kind of research may hold the cure for a whole host of diseases—is that embryonic stem cells have the potential to become virtually any kind of cell in the human body, such as brain cells, heart cells, or cells that produce insulin.

The difficult part of embryonic stem cell research for scientists is controlling the process by which embryonic stem cells become other, more specialized kinds of cells. Much more research into that process is needed. To quote a document prepared by the National Institutes of Health, ''the promise of stem cell therapies is an exciting one, but significant technical hurdles remain that will only be overcome through years of intensive research.''

The Federal funding this legislation authorizes will provide a critical boost to that effort.

Mr. President, like millions of other American families, my family has been touched by the ache of loss brought about by Alzheimer's disease. My father died of complications related to the disease only a few years ago. At the end of his life, I wanted nothing more than to be able to help ease his suffering. Now, as I reflect on that difficult time, I think of the families that are currently enduring the same pain mine did, and I want to help them.

I trust the vast majority of the scientific community that believes embryonic stem cell research may hold the key to the cures these families are seeking. I also believe that our Government can work to promote this science responsibly by paving the way for treatments that will save millions of lives without destroying others.

Toward that end, I believe the legislation passed by Congress last year and before the Senate today represents a measured, responsible step toward tapping into the vast potential that embryonic stem cell research has with respect to finding cures for Alzheimer's, Parkinson's, diabetes and a wide range of other devastating diseases.

In millions of cases, this legislation could mean the difference between a normal life and one of pain and suffering. In millions of other cases, it could mean the difference between life and death. And by authorizing Federal funding only for research on embryonic stem cells that will never become human life and that are donated willingly, it achieves its objectives without destroying the potential for life.

To be sure, support from private funds for this research has been welcome. But it is simply not enough. I have heard from scores of scientists in my home State of Colorado—working in university labs as we speak, trying to find cures for our most devastating diseases—who tell me that the Federal funding this legislation would authorize would boost their capabilities exponentially.

In addition to the practical impact on American laboratories, however, there is something else to consider. I can think of no other Nation that should lead this research with strict guidelines than the United States.

Throughout our Nation's history, America has been the leader in making monumental scientific strides that have made life easier and better for people in our country and all over the world. In a field with such great promise, and at a time where American competitiveness is at the forefront of the Congressional agenda, I believe we must once again be the global leader.

Mr. President, I want to be clear that I also believe we should promote alternative methods of creating embryonic stem cells. For that reason, I strongly support the other proposal that is currently before the Senate, S. 30, which would intensify research into these alternative methods.

I yield the floor.

Mr. HARKIN. Mr. President, how much time do we have remaining?

The PRESIDING OFFICER. The Senator from Iowa has 37 minutes.

Mr. HARKIN. I yield until 3:45 to the Senator from New York, Senator SCHUMER.

Mr. SCHUMER. Mr. President, first, I rise in strong and profound praise of my colleague from Iowa. He has led this fight dauntlessly, always being both dogged and smart. That is why we are where we are today.

I rise in support of S. 5, the Stem Cell Research Enhancement Act. Today, as we stand on the brink of scientific breakthroughs, we cannot let politics pull us backward. A modern nation

loses its greatness, its preeminence, when it turns its back on science. That is what history has shown.

Stem cell research is the key to hope for 100 million Americans and their families who suffer from debilitating diseases. Talk about it any way you want, spin it any way you want, talk about all these alternatives; the bottom line is very simple: A ''no'' vote is a vote against science, a vote against the millions who are anxiously awaiting a cure for diabetes, Alzheimer's, Parkinson's, spinal cord injuries and other diseases and injuries.

Unfortunately, we all know someone with a disease such as diabetes, heart disease, Parkinson's, ALS or cancer who could benefit from embryonic stem cell research. Every one of us has looked into the eyes of somebody who needs help—in my case, a young mother with a little girl about 5 years old who had juvenile diabetes who said: Senator, the doctors tell me the odds are high that my child could be blind at age 20 if we don't do embryonic stem cell research. How can we say no to that mother and to that child? Scientists are on the cusp of making incredible progress through stem cell research, a process that has the potential to cure diseases that have been with us for centuries, such as diabetes and heart disease.

When their progress was stalled in 2001 when President Bush limited federally funded stem cell research to only 19 sources that are truly viable, every family who had hope was set back. With that Executive order, the President shut the door on hope for all those families.

With that one action, the President not only stopped current research in its tracks, he sent a message to future scientists that they should not pursue this line of work.

As they see a limited funding stream for the work they do, fewer and fewer graduates are specializing in this type of research, and those who are deeply committed to it tend to go overseas. That is not a great America—an America that turns its back on science and puts politics in its place. We want all the best minds in the country to be working together to find a cure for these debilitating diseases.

S. 5 would answer the prayers of millions of families. It would increase the number of stem cell lines that can be used by researchers who are funded by Federal grants.

These stem cell lines are not made from new embryos that would be created for the purpose of research. They would not be harvested from women, like some people think. These lines would be made from leftover embryos created by couples who were trying to conceive through in vitro fertilization but are not used and are going to be destroyed. With passage of this bill, those embryos could contribute to critical research instead of being thrown away.

Let's think about the good that having these new stem cells could do by looking at juvenile diabetes. As many as 3 million Americans have Type I diabetes, with over 13,000 children newly diagnosed each year. These children must be injected with insulin multiple times each day and prick their fingers to test their blood sugar as many as six times a day.

That doesn't have to be the reality forever. Researchers have already demonstrated they can produce insulin-producing cells from undifferentiated embryonic stem cells. This has the real potential to develop a cure for juvenile diabetes, providing relief to the 3 million Americans and their families who are burdened with the implications of the disease every day.

Without being able to use Federal funding for their research, innovative stem cell research is being relegated more and more to only those individuals and institutions that can afford it.

Because NIH-funded research activities have to be housed in different buildings from stem cell research labs, which has created enormous headaches and financial barriers for researchers in my State of New York and has hampered both research on stem cells and research using other methods, unless we vote yes on S. 5, we are not going to make progress.

This bill would provide enormous hope to growing numbers of Americans. It would accelerate the movement toward a cure for devastating diseases, while strengthening the rules on ethics that must be involved in this research. This is one of those issues that hits home more than anything else. Everyone knows a mother with Alzheimer's or a neighbor with diabetes. They are gut-wrenching situations.

What is most heartbreaking is to think the President's first veto was to stop us from alleviating all this terrible pain. I urge my colleagues to look into the eyes of a young child with juvenile diabetes, look into the eyes of a middle-aged couple who has a parent suffering from Alzheimer's. Don't say no to them.

I yield the floor, and I yield the remainder of my time back to the Senator from Iowa.

Mr. ENZI. Mr. President, throughout the history of our Nation, generations of American scientists have looked for ways to improve the human condition and address the problem of disease and the afflictions of old age. Working in labs either spartan or spacious, they have toiled together over the years to find cures for the health conditions that continue to plague mankind.

As they conducted their research, each scientist's work built on the discoveries that preceded it, and the results they achieved over the years have enabled us to live longer, healthier, more productive lives. The list of medical miracles and marvels that have come from their work has made the phrase ''American ingenuity'' known around the world for the creativity it represents and the results it has so often provided.

From time to time, however, there is a breakthrough—or possible breakthrough—in medical science that has the potential to revolutionize not only our ability to diagnose or treat an affliction but our basic understanding of how the human body operates. When that occurs, a debate ensues as society attempts to evaluate the new procedure's potential to address the diseases that threaten our health as well as the ethics of putting the new procedures into practice.

Such a possible breakthrough is stem cell research. At present, its promise and potential for changing the way we view health and disease seems limitless. In theory, stem cells may be capable of doing everything we can possibly imagine—and more. Unfortunately, there is often a wide gap between what is possible in theory and what is practical and possible in the real world. What the future of stem cells will be no one knows for certain. Still, the possibilities are more than intriguing and certainly worth an in-depth look.

The research that has been conducted into stem cells so far has been so exciting because of the very nature of these cells. Stem cells have the capacity to renew themselves and then become specialized cells. Most of the cells that are in the body are created and committed to performing a specific function. A stem cell remains ''on the fence,'' however, uncommitted until it is given a signal by the body to develop into a specialized cell.

That ability to change and become a cell that can be used almost anywhere in the body has fascinated scientists who are studying the ability of the body to repair itself through the use of using these ''uncommitted'' cells.

We have all heard the saying—you don't have to be a weatherman to know which way the wind is blowing. In this case, however, you really do need a strong background in science to understand fully the specifics of stem cell research and its implications for the future. Fortunately, we are not here to predict the impact stem cells will have on our health care system in the years to come. We are here to make a determination as to the wisdom of using taxpayer dollars to finance additional work in this area—and then pick the best vehicle to support it. There is a big difference.

In debating and voting on the two bills before us today, we are not making a judgment about the science itself, as others have stated. Rather, we are making a judgment about whether that science should be supported by taxpayer dollars. We are deciding the appropriate moral construct for the work of those key scientists in manipulating and possibly even destroying the basic building blocks of human life. We are reaffirming how we as a society view the embryo and its function.

Every year, within our appropriations bills, we make a judgment about how we want to treat embryos—the very beginning of human life. The

Dickey-Wicker amendment is clear. Federal dollars cannot be used for creating human embryos for research purposes or for research in which a human embryo or embryos are destroyed, discarded, or knowingly subjected to the risk of injury or death greater than that allowed for research on fetuses in utero. Therefore, every year, as part of the appropriations process, we reaffirm that science must be guided by moral values, and our values as a society compel us to place certain limits on the pursuit of science. Today's debate will consider whether our values as a society compel us to maintain certain limits on taxpayer funding of embryonic stem cell research.

Without question, science must be guided by morality. There have been too many instances over the course of human history in which terrible things have been done in the name of science. Scientific exploration is important and we should do everything we can to further our knowledge of ourselves and our world, but not at the expense of disregarding the moral viewpoints of millions of Americans who don't believe their taxes should pay for something they find abhorrent.

In determining how to proceed, we of course must consider the promise of stem cell research. But in considering that promise, we must make it clear that while stem cells may someday lead to therapeutic advancements for devastating diseases like Alzheimer's, diabetes, Parkinson's, leukemia, and spinal cord injuries, that day has not come yet. That is why we must be careful not to oversell the promise of this research to the American people because this field of research has not yet resulted in human clinical trials. Every reputable scientist will admit that any possible cure or advanced treatment using embryonic stem cells are many years away. There are currently no cures waiting to be plucked off laboratory shelves after our votes on these bills.

So, while the research provides great hope for millions of Americans, at this point, the full benefits have not yet been realized. They fire our imagination as we consider the possibilities that may or may not come to pass. Whether embryonic stem cells will fulfill their promise someday is still very much in question, and much work is already ongoing to see whether we can get an answer.

In this context, I want to further discuss S. 5, the Stem Cell Research Enhancement Act of 2007. A similar bill was passed the House on January 11, 2007, by a vote of 253 to 174. S. 5 would allow additional research on embryos from in vitro fertilization procedures, under some limited circumstances.

However, even in these rather limited circumstances, I must oppose S. 5, because the limits it imposes on taxpayer-funded science do not respect the moral value of a human embryo. It does not fully recognize our decision within Dickey-Wicker and other contexts to treat the human embryo as more than simply material for scientific research.

The supporters of this bill will acknowledge that it does not limit research to human embryos that are currently frozen but extends the window for that research well into the future. By doing so, the bill creates an incentive for the creation of embryos solely for research purposes. This is contrary to what Congress reaffirms within the Dickey-Wicker language each year.

And, although the bill prohibits financial and other inducements for the parents of the embryo, it does not eliminate financial or other inducements for the clinics and doctors that create the embryos. Thus, it does not eliminate the financial incentives for in vitro fertilization clinics to create more embryos than are absolutely necessary to help parents conceive a child. This loophole will further erode the congressional prohibition through Dickey-Wicker against the creation of human embryos solely for research purposes.

I am not opposed to embryonic stem cell research, but I am opposed to the provisions of S. 5. I would welcome the opportunity to debate amendments to the bill, but the agreement that governs our debate does not permit amendments. And, without an opportunity to amend S. 5, I have no choice but to vote against it.

However, I will support alternatives, such as the Isakson-Coleman bill, so that we can allow greater Federal support for embryonic stem cell research. I believe we can and should unite behind a bill that respects the diversity of our views on human embryos, but still pushes the science forward. The Isakson-Coleman legislation is such a bill.

A vote for or against S. 5 is not a vote for or against scientific advances. After all, if we truly trust science, we ought to give science a chance to solve this dilemma over embryonic stem cell research. As outlined by the report from the President's Council on Bioethics, researchers are exploring at least five different ways by which we can create stem cell lines without harming or destroying embryos. If these researchers are successful, then the arguments against Federal funding of embryonic stem cell research will fall away.

Further, States and private research organizations are already plowing billions of dollars into human embryonic stem cell research that goes beyond the parameters of President Bush's policy. Let those efforts continue, while we continue working in Congress to support stem cell research that doesn't involve harming or destroying an embryo, which is something that the vast majority of Americans could support.

Mr. BUNNING. Mr. President, I would like to take a few minutes to talk about the two bills before us today dealing with stem cell research.

One of these bills is wrong, while the other offers us a chance to advance scientific research using stem cells while still protecting the sanctity of life.

Stem cell research remains a controversial issue in the medical, scientific and religious communities as well as in Congress. In fact, just last July, we were debating this very topic, and here we are again today.

I am not opposed to stem cell research. I believe that many forms of stem cell research offer great hope to millions of Americans suffering from various diseases, including research using adult and umbilical cord stem cells. We are already seeing medical advances in this type of research. In fact, adult stem cells have proven effective in combating several serious conditions, such as diabetes and spinal cord injury.

Also, just recently in the papers, scientists announced that amniotic fluid may be a promising source of stem cells. This shows we have a lot to learn about stem cells.

I am 100 percent opposed to embryonic stem cell research, however. This is why I will be voting against S. 5, the Stem Cell Research Enhancement Act of 2007.

This bill would remove all current protections against the destructive use of embryos for harvesting embryos for stem cells. I believe it is morally wrong to take embryos in the early stages of life and destroy them, even for research purposes. We should protect human life—not destroy it.

Back in 2001, the Bush administration began allowing Federal funding for embryonic stem cell research on a limited number of stem cell lines that were already in existence. As an opponent of the destruction of human embryos, I opposed the Bush administration decision to allow some embryonic stem cell lines to be used for Federal research.

However, S. 5 goes even further than the current policy by removing the current limitations set by the President on federally funded embryonic stem cell research. The bill allows Federal funds to be used for this type of research on embryos created for fertility treatments.

This is the wrong direction for us to go. It is immoral for us to conduct medical research on these budding lives, and American taxpayers should not be forced to pay for this type of research. Some people have argued that these embryos are ''excess'' and will be destroyed anyway. I firmly believe that we cannot create a human life and then destroy it in order to save a life. Ethically, it is unjustifiable.

In fact, it is important to remember that embryonic stem cell research is not illegal. There are just limitations on the Federal funding for it. Anyone can conduct embryonic stem cell research. They just have to live by the federal regulations or rely on other sources of money.

The other bill we are considering today, S. 30, the Hope Offered Through Principled and Ethical Stem Cell Research Act, offers us an opportunity to

further stem cell research in an morally defensible manner. The bill would allow stem cells to be derived from embryos that die naturally, and reinforces the current policy that federally funded research should not involve destroying or discarding embryos.

This bill provides access to embryonic stem cells, but protects human life and avoids the ethical pitfalls of S. 5. It seems to me that we should all be able to support this bill. It places reasonable restrictions on additional embryonic stem cell research, while also protecting human life. I urge my colleagues to support this bill.

No one likes to see people with medical conditions suffer, and like many Americans my family and friends have certainly been stricken with terrible diseases over the years. However, we are at an ethical crossroads with this issue, and we must stay true to our values of respecting life.

It seems foolish to barrel ahead with Federal funding for embryonic stem cell research as S. 5 does, when other alternatives are available that offer real hope to patients and promise in research.

In closing, I firmly believe that we cannot create life and then destroy it, even if to save another life. I urge my colleagues to vote against S. 5, and vote for S. 30.

Mr. DOMENICI. Mr. President, I rise today in opposition to S. 5, the Stem Cell Research Enhancement Act of 2007. Although I am not opposed to stem cell research and in fact enthusiastically support some types of stem cell research, I cannot support this bill.

This is a very difficult vote for me to cast. I have spent a considerable amount of time thinking about the issue of Federal funding for stem cell research involving the destruction of embryos. Over the last several years, scientific developments in human genetics have been proceeding at a rapid pace. This kind of research has the potential to be very helpful in the understanding of human development and the treatment of human diseases. However, this type of research also raises serious ethical and public policy questions that must be confronted. What limits do we place on research with human embryos?

Experimentation with embryonic stem cells is considered by some to be a revolution in medical research. Many in the medical, public and scientific communities believe that embryonic stem cell research could lead to the cure for such sicknesses as Parkinson's disease, Alzheimer's and diabetes. However, human embryos must be destroyed in order to derive embryonic stem cells and this is where my ethical dilemma arises.

It is my deeply held and personal belief that an embryo is an actual living being; it is not merely a potential living human being. The possibility of helping those who are sick may be a very powerful motivation, but I strongly believe that human embryos deserve the same respect as any other human being and it is never morally or ethically justified to kill one human being in order to help benefit another. It is for this reason that I cannot support the use of human embryonic material for research even if it has the potential to save others. I cannot accept the diminished status of the human embryo in order to justify their destruction in the course of research solely because they may theoretically provide potential benefits for another human being sometime in the future.

I want to make it clear that my ethical problem is not with the research itself but rather with the destruction of embryos. I believe there is potential for advances in stem cell research that does not involve the moral dilemma of destroying an embryo in the process. It is for this reason that I support S. 30, The Hope Offered through Principled and Ethical Stem Cell Research, HOPE, Act.

The HOPE Act will advance alternate forms of stem cell research by intensifying research on methods that do not involve the destruction of human embryos. This bill instructs the Secretary of Health and Human Services to develop techniques for the isolation, derivation, production, and testing of stem cells, provided that such techniques do not involve the creation of human embryos for research purposes; or the destruction or discarding of, or risk of injury to, a human embryo. Research that can benefit others without the destruction of human life is in my opinion the best path forward.

Scientists have shown they have the skill and ability to pursue the potential benefits of stem cell research without endangering human life in the process. I support these alternative approaches because I truly believe that they have the potential to help people while still maintaining ethical guidelines. This is the best way to allow Federal science-research on stem cells without offending the beliefs of millions of Americans.

Mr. ALLARD. Mr. President, I rise today to clarify my position on stem cell research. As a veterinarian I understand the need for research and scientific advancement. Current law does not prohibit any sort of stem cell research. In fact, all forms of stem cell research have flourished under current law.

I can not and will not support legislation that would drive abortion. Therefore I cannot support S. 5. This legislation would allow for Federal dollars to be used to incentivize the further destruction of human embryos for research purposes. I do not support this use of Federal funds. I will not oppose private industry from doing embryonic stem cell research, but it would be very irresponsible to use Federal taxpayer dollars to fund such a contentious issue.

Science is advancing. Over the past weeks and months research using adult stem cells has had many breakthroughs. The use of amniotic fluid and placental stem cells has much of the same potential that embryonic stem cells have, but they are not as controversial. S. 30 provides resources to further research in the area of adult stem cell research. Because of the emphasis on adult stem cell research, I support S. 30 and will vote in favor of S. 30 later today.

I not only understand the need for scientific advancement, but also for ethical boundaries. We should not be using Federal dollars to drive abortion, when there are alternative opportunities for scientific advancement that are not as contentious.

Mr. KYL. Mr. President, we live in an age when medical miracles are occurring every day, many in my home State of Arizona. Breakthroughs are treating and curing children and adults who could have died from their diseases just a few years ago. And some of these cures and treatments are the result of stem cell research.

For example, thanks to the Cord Blood Registry located in Tucson, children and adults are being treated, and often cured, of once terminal diseases such as leukemia, aplastic anemia, cerebral palsy, and sickle-cell anemia. And these are just a handful of the 72 diseases that have undergone clinical trials or been treated using stem cells obtained from bone marrow and umbilical cord blood.

I favor the broadest possible effort to pursue promising medical technologies within appropriate ethical limits. Scientists have derived stem cells from two principal sources: the tissues, fluids, and organs of adults, and cells from human embryos. Human embryonic stem cells have only been obtained through a process that destroys the embryo.

In the last Congress, we passed, and the President signed into law, the Stem Cell Therapeutic and Research Act of 2005. This legislation was intended to spur additional advances by establishing an infrastructure to facilitate the collection and dissemination of two of the most promising categories of adult stem cells: those derived from bone marrow and those derived from umbilical cord blood. Based on reports in the media over the past 2 weeks, I would say this bill has been a success.

For example, the New York Times reported on a coming revolution to sports medicine from adult stem cells that could be able to heal and rehabilitate tendons, ligaments, muscle and cartilage.

More significantly, ABC News reported that adult stem cells are being shown to be useful in repairing damaged heart muscle. While this has been known for some time in other countries, U.S. doctors and scientists are now embarking on the first human clinical trials. This may turn out to be one of the most significant breakthroughs in recent history for treating the most deadly disease in the United

States—heart disease—which last year claimed the lives of almost 500,000 Americans.

What's more, a recent study conducted by the Wake Forest University School of Medicine promisingly resulted in scientists harvesting stem cells from amniotic fluid, which is the fluid that surrounds a baby before it is born. These amniotic stem cells offer many of the benefits found in embryonic stem cells, and without its ethical complications, demonstrating just how much faster science is moving than politics. Those researchers at Wake Forest found that amniotic-fluid stem cells proved successful in producing bone, heart muscles, fat, nerve, and liver tissues. All of this was possible without destroying the nascent life in an embryo.

By contrast, embryonic stem cell experiments have not yielded any treatments for human patients. Nevertheless, researchers believe there is much potential there, so a great deal of private and public money has been raised to pursue it.

In 2001, the President issued an Executive order that made available for the first time Federal funding for embryonic stem cell research using embryos that had already been destroyed. In the subsequent 6 years, the Federal Government has spent more than $130 million on this type of stem cell research and has spent more than $2.5 billion on all stem cell-related research.

In 2006, the Senate considered legislation that would have overturned a key element of the current policy: the stipulation that Federal taxpayers' money cannot provide an incentive for the further destruction of human embryos. While this bill was approved by Congress, it was later vetoed by the President.

I voted against this legislation because I believe that taxpayers should not have to subsidize the destruction of nascent human life, especially when a number of State governments and large universities have directed significant resources to embryonic stem cell research. Since there are already billions of dollars available for embryonic stem cell research on lines from newly destroyed embryos, increases in Federal funding and a change in the Federal policy are not necessary.

S. 5, which we are debating today, and which is similar to legislation already passed by the House, is essentially the same legislation as that the President vetoed last year. There is one difference: added to S. 5 is legislation that was passed unanimously by this body last year—the Alternative Pluripotent Stem Cell Therapies Enhancement Act. I supported that legislation, which was not passed by the other body. However, that very positive legislation is attached to legislation I cannot support because it would force taxpayers to subsidize the destruction of nascent life.

Thankfully, S. 30 is also being considered today. I fully support this legislation offered by Senators COLEMAN and ISAKSON. Their leadership has brought to the floor a bill that would build on the research that is treating patients now. This legislation would direct the Department of Health and Human Services to seek out alternative sources of stem cells and to study the possibility of establishing an amniotic and placental stem cell bank, similar to the bone marrow and cord blood stem cell bank, while reaffirming a policy that prohibits research that destroys human life.

We can all agree: stem cell research holds promise and has already provided life-saving treatments and cures. And we should continue to support that research within appropriate ethical restrictions. I urge my colleagues to oppose S. 5 and support S. 30.

Ms. SNOWE. Mr. President, I rise today to speak to an issue of tremendous significance to countless Americans and to generations to come—the matter of stem cell research. I thank the majority leader for his efforts to ensure consideration of stem cell legislation. The bottom line is, there is research we should be conducting today that could help us treat—and in some cases cure—some of our most serious diseases. That is why two-thirds of Americans favor embryonic stem cell research and why I am an original cosponsor of the Stem Cell Research Enhancement Act.

The promise of stem cell research lies in the simple fact that embryonic stem cells have the unique potential to develop into any of the cells which could be needed to treat the multitude of diseases from which Americans suffer. The vast potential of stem cell therapy is key to future therapies because in so many diseases, cells in the body are damaged or destroyed, and their role is often irreplaceable. Stem cells offer an opportunity to actually replace the function which was lost.

Consider today that 20 million Americans live with diabetes. Despite treatment with drugs and insulin, many diabetics experience vision loss, injury to extremities, heart disease and other complications. For years, scientists have sought to find a cure. And today stem cells offer that potential to end dependence on insulin—freeing millions from diabetes.

In many diseases, there simply is not an effective therapy to replace the function which individuals lost or damaged cells can no longer provide. Today there are limited treatment options for brain disorders such as Parkinson's disease and ALS or Lou Gehrig's disease. For such diseases, stem cell therapies offer promise that we could alleviate the suffering that millions now experience.

This week the Senate is considering two bills. The first of these promotes stem cell research. It encourages research which is already underway—which is eligible today for both private and public funding. And while that research should be encouraged, it is not facing impediments, save for the fact most of us would like to see greater progress in biomedical research funding—and stop the erosion of the budgets of the National Institutes of Health.

Yet since no impediment exists to the work described this first bill describes, this legislation is—despite its positive aspects—a distraction from a crucial question. That is, whether we will continue to impede progress in human embryonic stem cell research.

The problem is, that while scientists are tackling stem cell research on multiple fronts, to ensure success they try to predict the path most likely to be successful. In that regard, we know that embryonic stem cells have the potential to develop into any cell type of the body. That is why scientists have sought to use them in their race to create cures.

Today, Federal funding for research is restricted to a small number of embryonic stem cell ''lines'' that were established prior to August 9, 2001. Unfortunately, only 19 of those 78 stem cell lines in existence are available to researchers, as many were found to be contaminated or otherwise unusable. We recognize today that even when a stem cell line is created, it simply cannot reproduce indefinitely.

So, many scientists are frustrated, are perplexed that a Federal funding restriction would essentially block their efforts to develop cures. Some have proposed they should use adult stem cells. Yet those involve a detour in the journey to a cure.

We know that in order to use embryonic stem cells to make cells which can be used to treat a disease—like diabetes—scientists must learn how to make the cell become the right type. But an adult stem cell is actually already somewhat specialized, so one cannot directly use them to produce many of the types of cells we need to produce new therapies. Some advocates of adult stem cell research say we could try to take such a stem cell and reverse its development—back to an embryonic stage—and then begin the task to develop it into the specialized cell required. It is as if you were driving down an interstate on a trip, took an exit, made a few turns, and then decided to back up—in reverse—all the way to the interstate in an attempt to try another destination. This is not an efficient way to get where you are going. And any scientist will tell you, the more steps you must take, the more chance there is that something simply won't work.

Recently some have proposed that scientists could use other types of cells. We have learned recently about stem cells which are found in amniotic fluid—''amniotic stem cells''—which also appear to have potential to develop into different types of tissues. This is an encouraging development, yet much remains to be learned about those cells. The leader of the research group which has just described these

cells—Anthony Atala—was recently asked whether his research ends the argument over whether embryonic stem cells are needed. He answered that question simply:

It does not, mainly because it's another stem cell choice. And I think you really can't tell which cell is going to be best for which indication, and all cells have advantages and disadvantages.

That is truly the statement of a scientist. Because we do not yet know about the full potential of these alternatives to embryonic stem cells. But we do know that embryonic stem cells can develop into any type of cell. That is why losing years in which we could have made progress is so tragic. There is so much that scientists have yet to learn, and while we always hope for quick cures, experience shows that medical breakthroughs typically result from years of concentrated effort—and we cannot wait any longer to embark on that journey.

That is why I am a cosponsor of the second bill which we are considering—the Stem Cell Research Enhancement Act. This legislation addresses the critical issue which has inhibited research here in the U.S.—the restriction of Federal funding to only those few stem cell lines which were in existence back in 2001. Our legislation would ensure that Federal research would only use stem cells from embryos which would otherwise be destroyed and would require full consent from the donor before coming into use. I thank Senators SPECTER and HARKIN for their leadership on embryonic stem cell research.

The legislation which they have championed sets a very constrained set of circumstances under which embryonic stems cells may be obtained in order to assure we can move this vital research forward within an ethical framework. Never will an embryo be created for research purposes, nor does this legislation facilitate such studies. This legislation assures that an embryo may be used only when it would not ever be used for infertility treatment. Donation must be voluntary, under full informed consent and no financial or other inducement may be given.

The fact is that fertility treatment has allowed many to have families whom otherwise could not. A consequence of this remarkable therapy is that some embryos are created which will not be used. I must note that under the Stem Cell Research Enhancement Act, it will be the couple who will—under no bias—decide whether they will be used. This legislation facilitates that donation.

Today Americans who have faced fertility problems are facing the question of what to do with unused embryos. Indefinite storage is not truly an option—we know that we cannot maintain the viability of these embryos indefinitely. So given the choices available, some couples see the potential to help those suffering from serious disease. It assures that this gift can be given and used to help medical progress.

I believe many Americans who have undergone fertility treatment and realized a gift of life in their families will opt to save lives through a donation which promises to save many lives. But it must always be individual conscience that is the determinative factor—and I respect the views and conscience of each and every individual on this matter.

There can be no doubt that stem cell research will move forward. The real question is whether our Nation will be engaged—whether our scientists will realize the breakthroughs—whether we will produce the treatments or whether those developments will draw our best minds and new medical investment abroad, where American vision and oversight will not influence the future of medicine.

I believe in stem cell research. I believe in it because I cannot look at a person suffering from a debilitating, and even fatal disease and support prohibitions which impede ethical research aimed at alleviating of that suffering. That is why I joined with my colleagues in the Senate in urging President Bush to ease the current restrictions on the use of stem cells so that research can move forward and lives could be saved. That is why I am a sponsor of this legislation. It is why I urge my colleagues to give that bill their support. This is the bill which will make a difference. I urge the President to reconsider this issue, and urge his support.

I think back to President Reagan's passing nearly 3 years ago, and remember the outpouring of concern we all had for our former President, and the First Lady and their entire family. We spoke much of the tragedy of Alzheimer's disease and how we must do more to alleviate the suffering. Nancy Reagan inspired us all with her courage—and inspires us no less in her call for research which could alleviate the suffering from so many diseases. Her recent words call out to us, ''A lot of time is being wasted . . . A lot of people who could be helped are not being helped.''

I cannot think of a more significant living memorial to our former President than to allow more research to be done in order to find new cures for diseases affecting millions of people.

Today I ask my colleagues to consider allowing individuals—who have through modern medical science, enjoyed a gift of life, to contribute to saving other lives. That is exactly what this legislation does, and that is why we must send this bill to the President and he must sign it.

Mr. OBAMA. Mr. President, I stand in full support of the Stem Cell Research Enhancement Act as I did when this bill was introduced and sent to the President's desk in the 109th Congress. I am proud to be an original cosponsor of this bill.

I am frustrated by the opposition this bill has generated and saddened that we are preventing the advancement of important science that could potentially impact millions of suffering Americans. The study of stem cells holds enormous promise for the treatment of debilitating and life-threatening diseases. However, in order to reach this level of medical achievement, much more research is necessary to understand, and eventually harness, the amazing potential of stem cells. Instead of creating roadblocks, we must all work together to expand Federal funding of stem cell research and continue moving forward in our fight against disease by advancing our knowledge through science and medicine.

Each year, 100,000 Americans will develop Alzheimer's disease, with impaired memory, ability to understand, and judgment. Over 1 million adults will be diagnosed with diabetes this year, and risk complications that include blindness, damaged nerves, and loss of kidney function. We all know or have met individuals with spinal cord injuries, including national celebrities, local war heroes, and loved ones from our own families and circles of friends, who are struggling to maintain mobility and independence.

For most of our history, medicine has offered little hope of recovery to the 100 million individuals affected by these and other devastating illnesses and injuries.

Until now.

Recent developments in stem cell research may hold the key to improved treatments, if not cures, for those affected by Alzheimer's disease, diabetes, spinal cord injury, and countless other conditions.

Many men, women, and children who are cancer survivors are already familiar with the lifesaving applications of adult stem cell research. Patients with leukemia or lymphoma often undergo bone marrow transplants, a type of stem cell transplant, which can significantly prolong life or permanently get rid of the cancer. This therapy has been used successfully for decades, and is saving lives every day.

Yet this breakthrough has its serious limitations. Adult stem cells, such as those used in bone marrow transplants, can only be collected in small quantities, may not be a match for the patient, which can lead to rejection, and have limited ability to differentiate or transform into specialized cells.

Similarly, the promising advances of stem cell use from a patient's own cord blood, as illustrated by the success stories of Dr. Joanne Kurtzberg from Duke University, also have their limitations. If, for example, a young cord blood recipient's condition should deteriorate after his or her initial treatment or should develop another illness, there simply are not enough cord blood cells left for a second use. The few remaining cells would have to be cloned to get enough cells for future treatment, or stem cells would have to be obtained from another source.

Two of my constituents, Mary Schneider and her son Ryan, are well aware of the potential of cord blood treatments. Her son, diagnosed with cerebral palsy at 2 years of age, has made what appears to be a full recovery after treatment with his own cord blood. Despite the compelling results witnessed by the Schneider family, they also firmly believe and support expanded research of embryonic stem cells to combat disease.

A recent scientific paper about stem cells derived from amniotic fluid has drawn much attention. While this offers an exciting alternative to regenerative medicine therapies, the author of that report, Dr. Anthony Atala, has himself urged that his work on amniotic stem cells will not replace the continued need for investigation into treatments with stem cells derived from embryos.

All of these alternative treatments are just that, alternatives, and are not substitutes for embryonic stem cell research.

Embryonic stem cells can be obtained from a number of sources, including in vitro fertilization. At this very moment, there are over 400,000 embryos being stored in over 400 facilities throughout the United States. The majority of these are reserved for infertile couples. However, many of these embryos will go unused, destined for permanent storage in a freezer or disposal. We should expand and accelerate research using these embryos, just as we should continue to explore the viability of adult stem cell use, cord blood use, and amniotic fluid use.

The promise of embryonic stem cells has come to light in a recent achievement by researchers at Johns Hopkins. They were able to repair damaged nerves and restore mobility in paralyzed rats through embryonic stem cells. One can't help but wonder when, not if, this research will be translated into techniques that will help human patients who have lost the ability to walk.

Of course, any work in this area must have appropriate oversight. Embryonic stem cell research demands comprehensive, thoughtful, and carefully crafted ethical and scientific guidelines. We must not only look to guidance from the National Institutes of Health and the Food and Drug Administration but also to our reason, our morals, and our compassion.

The President's veto of the stem cell bill proposed in the last Congress prevents Government funding beyond 78 previously established stem cell lines. However, recent estimates on the number of viable cell lines bring the numbers down closer to 20. Clearly, we are moving backward in our efforts with these current restrictions. Stymieing embryonic stem cell research is a step in the wrong direction. It closes the door on many Americans awaiting new treatments that could potentially provide a better quality of life or, perhaps, even save their life.

My hope, and the hope of so many in this country, is to provide our researchers with the means to explore the uses of embryonic stem cells so that we can begin to turn the tide on the devastating diseases affecting our Nation and the world.

Mr. VOINOVICH. Mr. President, I rise today to speak about the emotional, divisive, and often confusing issue of stem cell research. Let me start by expressing why I believe we should focus our scarce resources on adult and umbilical cord stem cells rather than on embryonic stem cells.

Given the tremendous results that have come from adult and umbilical cord stem cell therapy in the areas of oncology and orthopedics—and, more recently, in cardiology and neurology—I am further encouraged by the possibilities these noncontroversial, adult stem cells have to offer. In this tight budgetary environment, in which there is a choke hold on our domestic discretionary spending, we must be vigilant in the way we appropriate taxpayer dollars and concentrate our resources on those lines of medical research that hold the greatest potential.

Furthermore, in recent years, scientists have made tremendous strides in designing methods to obtain fully pluripotent stem cells that have the flexibility of embryonic stem cells, while avoiding the destruction of human embryos. The potential to extract these versatile stem cells in an ethically sound manner, coupled with my interest in seeing further research in the area of adult and umbilical cord stem cells, is why I rise to support S. 30, the HOPE Act.

Before I delve into a discussion of the two bills this body is considering, let me clarify that there are two different categories of stem cells—and, thus, of stem cell research. The first, embryonic stem cells—as their name suggests—are derived from human embryos developed from eggs that have been fertilized at an in vitro fertilization clinic. Alternatively, adult stem cells are undifferentiated cells found among differentiated cells in tissues or organs. These cells can renew themselves and eventually develop into a specific cell in the body. What is notable, however, is that these undifferentiated adult stem cells can be gathered by scientists without any harm to the individual donor.

Umbilical cord blood derived from a mother's placenta following the birth of a newborn baby is now also included in this category of adult stem cells. In fact, with the arrival of my seventh grandchild, I learned a great deal about the benefits of preserving cord blood stem cells. What at one time was considered medical waste and discarded after birth is now recognized as a rich supply of stem cells and has been used to treat a number of blood and immune-system diseases, cancers, and other physical disorders.

I was introduced to the promise of adult and umbilical stem cell research by experts at the National Center for Regenerative Medicine in my hometown of Cleveland, OH. Several institutions make up the center, including Case Western Reserve University, the Cleveland Clinic, University Hospitals Case Medical Center, Athersys, Inc., and the Ohio State University. Together they have created an outstanding medical facility that is leading the Nation in the use of nonembryonic stem cells to regenerate new tissues in diseased organs rather than using drugs or devices to improve the function of the organs.

Since 1976, researchers at the center have been studying nonembryonic stem cells, and they performed their first stem cell transplant as early as 1980. Today, the center is capable of conducting clinical trials with cord blood stem cells for gene therapy and for heart and blood vessel repair. Investigators at the center are now able to cure leukemia and lymphomas with nonembryonic stem cell transplantation, as well as repair unstable bone fractures and treat genetic disorders.

I have had the chance to meet several patients whose lives have been transformed by this new medicine. Elisabeth, who was a patient at the National Center, was in a motorcycle accident and had compound fractures in her right femur and right tibia. Even though she was rushed into emergency surgery after the accident, her bones did not heal properly, and she was told she would never walk again. Elisabeth sought out a second opinion from a doctor at the National Center who operated a second time, using some of his adult stem cell gel. This gel takes on the characteristics of the surrounding bone cells and helps with the healing of broken bones. I am happy to report, Elisabeth is now walking, living a healthy life, and pursuing a future in physical therapy at the Ohio State University.

Elisabeth is not alone.

I recently visited the National Center for Regenerative Medicine, and I had the chance to meet Ashley. Ashley is 8 years old and was successfully treated for her leukemia at Rainbow Babies and Children's Hospital of University Hospitals Case Medical Center. She was first diagnosed with acute lymphatic leukemia, ALL, in January 2006, and she underwent a stem cell transplant from an unrelated donor in June 2006. But since her transplant, Ashley has done wonderfully.

Even more encouraging is the potential for scientists to leverage all this great medicine into new fields, including cardiology and neuroscience. Researchers at the National Center for Regenerative Medicine are hopeful that in the not so distant future they will make inroads in the treatment of degenerative arthritis, will decrease the severity of graft versus host disease after stem cell transplantation, and will allow physicians to use a patient's own stem cells to repair heart damage following congestive heart failure, as

well as use their own neural stem cells to improve function after spinal cord damage.

I am concerned, however, that not enough Americans are aware that some of the most advanced medicine today can be attributed to adult—and not embryonic—stem cells. What I find even more disturbing is that many supporters of embryonic stem cell research have been kept in the dark about the advances of umbilical and adult stem cell treatments and have been over-sold on embryonic stem cell research, which is still in its infancy.

I want to remind my colleagues who support the Stem Cell Research Enhancement Act that embryonic cells have not been successfully used to treat even one disease yet I have had the opportunity to meet numerous people whose lives have been saved by adult stem cell therapy. In fact, adult stem cells have been used to treat 72 diseases, including breast cancer, multiple sclerosis, rheumatoid arthritis, sickle cell anemia, spinal cord injuries, and others. That is why I continue to be encouraged by the possibilities adult stem cells have to offer.

In recent years, medical research has made tremendous strides, and it is now widely believed that new technology can lead to methods of obtaining fully pluripotent stem cells that have the flexibility of embryonic stem cells without destroying potential life. That is why I rise today to support S. 30, the HOPE Act.

Despite all this progress, scientists around the world agree that there is still a great deal that remains unknown about the potential for stem cell therapy. That is why I support this legislation introduced by my colleagues from Minnesota and Georgia that can help us tap even more potential cures and therapies.

The HOPE Act would continue to encourage Federal research on adult and umbilical cord stem cell therapies that are already proving successful, while requiring the Secretary of Health and Human Services to develop techniques to identify and derive pluripotent stem cells that have the flexibility of embryonic stem cells without destroying a human embryo. There is evidence that these alternative methods may make it easier for scientists to genetically match patients with therapies and could reduce the complications, like tumor formation, that have been seen with embryonic stem cells.

The HOPE Act would also require the Secretary to prioritize stem cell research that will reap near-term clinical benefit and take into account the findings of the President's Council on Bioethics along with other appropriate techniques and research. It is my hope that this type of progress will help eliminate the controversy surrounding embryonic stem cell research without any compromise of scientific advancement. This legislation paves a path forward for Federal scientists, while respecting the principles and morals of millions of taxpayers.

I believe it is my moral responsibility to direct the Federal Government's dollars toward research that has the greatest near-term potential to help the largest number of Americans.

Over the past several years, Congress has increased total NIH funding for medical research—including increasing the amount of money available for stem cell research—from $15.1 billion in fiscal year 1999 to $28.9 billion in 2007. However, in recent years the cost of fighting the war in Iraq, defending our homeland, and protecting against natural disasters like Hurricane Katrina has left very few resources for domestic discretionary spending. In fact, today, the Federal Government spends only one-sixth of its annual budget on nondefense discretionary spending, and I am afraid that exploding entitlement spending threatens to soak up every Federal dollar, leaving no revenue for things like scientific research. There is a tremendous need to pursue treatments for many diseases, but we face a reality of limited funding.

We have to be smart about spending our money. In the current budget environment, I have concerns that increasing funding for research on embryonic stem cells will take away opportunities for research in areas like adult and umbilical research that has proven its ability to save human lives—or even for new techniques to help us remove pluripotent stem cells without destroying human embryos.

I have the greatest sympathy for patients and their families who continue to struggle with a wide range of fatal diseases. I understand what it is like to watch a loved one suffer and the tragedy of losing a member of your family—especially a young child. I lost my father to diabetes and my young nephew C.T.—who was only 14—to bone cancer. Like many here today, I have been a witness to the devastating effects of Alzheimer's, arthritis, and many other debilitating diseases. That is why I am sympathetic with my colleagues' efforts to seek out a panacea. But I fear that too often proponents of embryonic stem cell research make exaggerated claims about this line of research and offer false promises when the evidence is just not there.

I read a great op-ed in The Washington Post by Charles Krauthammer—who has long supported legal abortions and doesn't believe that life begins at conception—in which he issued a stern warning against pursuing embryonic stem cell research. As he said, he has a very healthy respect for ''the human capacity for doing evil in pursuit of good.'' And, that is exactly what I see happening in this Chamber today. Too many of my colleagues are focused exclusively on embryonic stem cell research, and they are missing potential that is right under their noses.

I am reminded of Aesop's fable, ''The Stag at the Pool,'' in which a stag stops at a spring to drink some water. He looks down at his shadow reflected in the water and greatly admires the size and shape of his beautiful horns, all the while thinking that his feet are too slender and too weak. Just as he is looking at his reflection, a lion appears at the pond. The stag sees the lion in the water and runs as fast as he can to safety. As he enters the woods, though, his horns get tangled in the tree branches, and the lion catches up to him. Finally, at that moment, the stag realizes that it was his feet that could have saved him and his antlers that led to his demise.

The moral of the story is: What is most truly valuable is often underrated. I think the same is true on the subject of stem cell research. We have been so focused on what we perceive to be the future of medical research that we have been willing to overlook successful treatments and therapies that are already taking place right under our noses.

In light of all the advances and results science has provided with adult and umbilical cord stem cells, I urge my colleagues to direct Federal funding toward research that will have the greatest near-term impact on human life.

Mr. KOHL. Mr. President, I rise today in support of S. 5, the Stem Cell Research Enhancement Act of 2007, a bill that will expand the number of stem cell lines eligible for federally funded research, ensuring scientists at NIH and laboratories around the country have access to new, uncontaminated stem cell lines.

Many families in America have experienced the tragedy of watching a loved one suffer through a deadly or debilitating illness. Diseases like Parkinson's and Alzheimer's take a terrible toll on families' lives and livelihoods. While we have made great strides in biomedical research in recent years, we still don't have all the keys to unlock the secrets of disease.

That is why the potential of embryonic stem cells is so exciting. Embryonic stem cells have the ability to develop into virtually any cell type in the human body. Scientists tell us that harnessing the power of these cells could one day lead to new treatments, and maybe even cures, for a number of diseases that afflict American families. Important research is being done every day on stem cells. I am proud that some of this research is being done at the University of Wisconsin in Madison, which was the first to isolate human embryonic stem cells.

We all understand that this research is not without controversy. I respect the concerns that some people have about the use of embryonic stem cells in research, and I agree that we must closely monitor this research to ensure that it is done ethically. However, scientists and disease advocates are warning us that the current limits on Federal funding for stem cell research are seriously inhibiting our potential to find new cures. Without expanded Federal support, we risk slowing down the

tremendous progress that could be made to alleviate human suffering.

It would be unconscionable for the Federal Government to turn its back on the discoveries that expanding stem cell research promises. Now more than ever, it is important to grasp this opportunity in an ethical manner by making sure that potentially lifesaving research keeps moving forward.

Mr. AKAKA. Mr. President, I am proud to be a cosponsor of S. 5, the Stem Cell Research Enhancement Act. We must enact this legislation so that researchers are able to move forward on ethical, federally funded research projects that develop better treatments for those suffering from diseases. Human embryonic stem cells have such great potential because they have the unique ability in developing into almost any type of cell or tissue in the body. Stem cell research holds great promise to develop possible cures or improved treatments for a wide range of diseases and injuries, such as diabetes, cancer, Parkinson's disease, Alzheimer's, autism, heart disease, spinal cord injuries, and many other afflictions. We must not limit research that could improve the lives of so many suffering from diseases that we have limited ability to prevent, treat, or cure.

In August 2001, the President implemented an unworkable, flawed policy that made a small number of human embryonic stem cell lines eligible. The President's restrictions on stem cell research prevent Federal funds from being used for research on newer, more promising stem cell lines. In addition, embryonic stem cell lines now eligible for Federal funding are not genetically diverse enough to realize the full therapeutic potential of this research. The President's stem cell policy prevents researchers from moving ahead in an area of research that is very promising. We must enact this legislation to help move research forward that could alleviate the pain and suffering of individuals.

If we fail to enact S. 5, our researchers are likely to fall further behind the work being done in other countries. Australia, Canada, Finland, France, Japan, Singapore, Sweden, and the United Kingdom have provided substantial governmental support for stem cell research.

Too many of my constituents suffer from Alzheimer's, Parkinson's, diabetes, and other diseases. S. 5 provides some hope for the development of improved treatments that could improve the lives of so many people.

Mr. McCAIN. Mr. President, I will vote in support of the two bills under consideration today, S. 5 and S. 30, which would provide a framework for Federal support of stem cell research under strict guidelines and ethical criteria. I supported similar legislative proposals during the last Congress.

Stem cell research has the potential to give us a better understanding of deadly diseases and spinal cord injuries affecting millions of Americans. One day, these efforts may lead to cures and treatments for these devastating diseases and conditions. At the same time, it is important and right to recognize the ethical and moral concerns that have been raised by individuals inside and outside of the medical research community regarding one particular type of stem cell research that involves embryonic stem cells. I believe that these two bills will provide an appropriate framework for moving stem cell research forward in a responsible way.

We must create a framework for Federal support of stem cell research now, since research involving embryonic stem cells is also proceeding outside the United States. While we have had a robust and needed debate on the ethical and moral concerns of embryonic stem cell research, as reflected by the President's Commission on Bioethics, the same cannot always be said of private industry and scientific research communities in other parts of the world. I am deeply concerned where unregulated research may lead us if researchers are left without ethical and moral guidance and stringent regulations and oversight.

It does not have to be that way. One bill before us today, S. 5, is similar to H.R. 810, a bill that I supported and that passed the Senate on July 18, 2006. S. 5 will provide the same strict ethical guidelines for stem cell research that the Senate supported last year. This bill would authorize Federal support for embryonic stem cell research, but limits appropriately that support to scientists who use embryos originally created for reproductive purposes, and now frozen or slated for destruction by in vitro fertilization clinics. Before there is even consideration of whether to donate unused embryos for research, the legislation would require that the patient who is the source of the embryos be consulted and a determination be made that these embryos would otherwise be discarded, and would never have been implanted in the patient or another woman.

S. 5 also provides support for alternative stem cell research methods by offering increased Federal funding and support for research that does not involve the use of human embryos. Such alternative research was unanimously supported in the Senate last July and deserves our full support again today. Researchers believe that this type of stem cell research holds tremendous potential and I strongly support their efforts. Millions of Americans affected by many diseases and conditions stand to benefit from the future cures provided by this type of research.

I am also supportive of the other measure that is before us today, S. 30. This bill will also offer increase Federal funding and support for adult stem cell research and other research that does not involve the use of human embryos. Additionally, S. 30 would allow research to be performed on embryonic stem cells taken from naturally dead embryos. This research shows some promise but only additional research will tell whether it can lead to cures and treatments, and we should embrace the opportunity that would be afforded under this legislation to determine the research potential that might exist.

The United States offers an ideal climate for scientific and medical research because of the quality of our educational institutions, the strength of our economy, and the scope of our comprehensive legal and regulatory system for protection of intellectual property rights. The guidelines and requirements contained in S. 5 do not exist currently, and this sort of embryonic stem cell research remains largely unregulated in the private sector and in many scientific communities overseas. Enacting S. 5 would provide the Federal oversight necessary to ensure that embryonic stem cell research does not expand into ethically objectionable ground in balancing the promise on the foreseeable horizon of stem cell research with the protection of human life.

It should be clearly recognized that embryonic stem cell research will occur with or without Federal approval and guidance. Keeping that in mind, I believe embryonic stem cell research is best carried out under strict Federal guidelines and oversight. With the limited Federal support and stringent guidelines afforded under this legislation, we can promote the benefits of stem cell research while maintaining clearly our ethical and moral values and obligations, which we must never sacrifice at any price.

Mr. LEAHY. Mr. President, I wish to express my support for the bill before the Senate this week, S. 5, the Stem Cell Research Enhancement Act of 2007. This legislation will put us on the path of progress by reversing the President's policy a policy that is holding back the promise of stem cell research.

It is unfortunate that the Congress must even spend time debating this measure. The majority of Americans support stem cell research, as does the Director of the National Institutes of Health, Dr. Elias Zerhouni. It has been 6 years since the President announced his administration's restrictive policy on stem cell research, which limited the number of stem cell lines available for use with Federal funding. Now we know that all of these lines are contaminated by the use of mouse feeder cells, and they will probably never meet the standards required for human treatment.

It is clear that, because of the President's policy, we are now years behind in developing therapies and cures for diseases such as diabetes, Alzheimer's and cancer. That is time that millions of Americans simply do not have to waste. For millions of others, this wasted time has dampened hope.

Some families who hold out hope for the potential of stem cell research are from Vermont. Many are either afflicted by, or know someone one who is

suffering from, multiple sclerosis, Parkinson's or Lou Gehrig's disease. I have met these Vermonters, many of whom are advocating not for themselves, but for future generations who they hope will not endure the debilitating nature of these diseases.

There are others in Vermont who know firsthand the good this research could bring. These are the scientific researchers at the University of Vermont and Dartmouth College who are doing groundbreaking work that needs the support of our federal government to be truly successful. These scientists know that the most viable method for progress in research is to expand the number of embryonic stem cell lines that are available.

I would like to take a moment to also address some of the myths perpetrated about what S. 5 will and will not do. Let us be clear: This bill will not allow Federal funds to be used for the destruction of human embryos. While Federal dollars can be used for research on stem cell lines that are derived from human embryos, the creation of these lines cannot be funded with Federal moneys. S. 5 will do nothing to change this policy.

This legislation will also ensure that Federal funding will be used only for researching stem cells lines that are derived from human embryos that have been donated from in vitro fertilization clinics. The in vitro fertilization process creates more embryos than are needed, and the remaining embryos will simply never be used. There are more than 400,000 of these embryos that are frozen in fertility clinics, the majority of which will ultimately be destroyed.

This week the Senate will vote on two stem cell bills. While I support both, only one of these bills will take us solidly forward. The time for passage of this legislation is now, and I urge the President not to veto this critical bill.

I hope that the President will heed the advice of his own chief medical researcher in the United States, NIH Director Dr. Zerhouni who, when he testified before the Labor, Health and Human Services Appropriations Subcommittee, said that American science would be better served, and the Nation would be better served, if we let our scientists have access to more cell lines.

As Congress is poised to send this legislation to the White House, I hope the President will take note of Dr. Zerhouni's remarks. I hope that he will also listen to Congress and the millions of Americans who believe that we should support all angles in stem cell research, and sign this bill.

● Mr. DODD. Mr. President, I rise today in support of the Stem Cell Research Enhancement Act. In the coming hours, the Senate will vote to pass this bill like it did last year and unlock the door for researchers across the country to use embryonic stem cells to better understand diseases like Parkinson's and juvenile diabetes so that we may one day find a cure. With each day that has passed since the President vetoed this legislation, nearly 4,100 Americans were diagnosed with diabetes, 3,800 were diagnosed with cancer, and 160 were diagnosed with Parkinson's. What we are talking about here is research that may one day provide relief to the more than 100 million Americans suffering from Parkinson's, diabetes, spinal cord injury, ALS, cancer, and many other devastating conditions for which there is still no cure.

The legislation we are about to vote on would expand the number of embryonic stem cell lines available for federally funded research by allowing the use of stem cells derived through embryos from in vitro fertilization clinics that would otherwise be discarded. Strict ethical requirements apply to the use of these stem cell lines. In fact, I believe these ethical requirements are one of the most essential provisions of the bill. Since the HELP Committee first began consideration of the President's policy toward embryonic stem cell research in 2001, I have maintained that the pursuit of scientific research that may benefit millions of Americans and their families was as important as ensuring that science did not outpace ethics.

Under this legislation, the only embryonic stem cells that can be used for federally funded research are those that were derived through embryos from in vitro fertilization clinics that were created for fertility treatment purposes and were donated for research with the written, informed consent of the individuals seeking that treatment. Any financial or other inducements to make this donation are prohibited. These embryos will never be implanted in a woman and would otherwise have been discarded. The ethical requirements contained in this bill are stronger than current law. In fact, it is possible that some of the 21 stem cell lines approved for Federal funding, the so-called ''NIH-approved lines,'' may not meet the strict ethical criteria contained in this bill.

I have heard some of my colleagues who oppose this legislation argue that this legislation allows, even encourages, taxpayer-funded destruction of human embryos. That is totally false. There is a provision called the Dickey amendment which is attached to every annual Labor-HHS appropriations bill prohibiting any Federal funds from being used to destroy human embryos. This provision is not affected by the embryonic stem cell legislation before the Senate today. Federal funds can be used to study stem cell lines that were derived from human embryos that meet the ethical requirements I just laid out, but the derivation process itself cannot be paid for with Federal money.

I have also heard some of my colleagues who oppose this legislation argue that embryonic stem cell research is unnecessary given the advances in adult stem cell research. There is no question that adult stem cells such as those found in bone marrow and cord blood have led to great advances in patients suffering from leukemia, Hodgkin's disease, sickle cell anemia, among others. I was a coauthor, along with Senator HATCH and others, of a bill that is now law to advance bone marrow and cord blood stem cell collection for use in adult stem cell transplantation, and I believe it is essential that we arm researchers and physicians with every possible therapeutic weapon in their medical arsenal. I urge my colleagues to join me in supporting full funding for this important law, which passed unanimously in the Senate, in the upcoming Labor-HHS-Education appropriations bill.

The fact remains that there will always be limits to the use of adult stem cells when compared with embryonic stem cells, and that is why the legislation before us is so important. Our Nation's best scientists, including many Nobel laureates, believe that embryonic stem cell research has a unique potential to ease human suffering and that is because embryonic stem cells, unlike adult stem cells, can become any cell in the body. Embryonic stem cells can become heart cells, lung cells, brain tissue, and that property—called pluripotency—is unique to their embryonic state.

The expansion of embryonic stem cell research may one day unlock the mysteries behind so many deadly and debilitating diseases that afflict millions of Americans and their families. I urge the President to reconsider his position on this legislation and not stand in the way of our Nation's scientists who simply want to find the key that will ease the burden of suffering.●

Mrs. CLINTON. Mr. President, I welcome the vote on this important piece of legislation, the Stem Cell Research Enhancement Act of 2007.

Stem cell research holds great hope of providing cures for chronic, incurable conditions from which millions of Americans suffer. But unless we act, the Bush administration will continue to meet this unparalleled moment of scientific discovery with unbridled ideology—and the American people and scientific community will pay the price.

The President's stem cell ban amounts to a ban on hope for millions of Americans. It's time this Congress put an end to the Bush administration policy which is holding science back and holding our Nation back in the race to new medical treatments and discoveries.

We all expect that this bipartisan legislation will pass both the Senate and the House. There is a broad consensus in the Congress, among medical experts, scientists, and patient advocacy organizations, and among the American people, demanding that we open the doors to scientific innovation—instead of barring those doors shut.

Even within the Bush administration, there is a desire to pursue stem cell research. The Director of the National Institutes of Health, Doctor Elias Zerhouni, has gone on record supporting expanded access to new lines of embryonic stem cells.

I am deeply concerned, however, that we have been down this road before a road that begins with the promise of new cures and ends, not with discovery, but with ideology and a veto by the President.

The promise of stem-cell science is crystal clear—and already being demonstrated. Embryonic stem cells develop into a variety of more specialized types of cells—like nerve cells or muscle tissue that could be used to replace or repair tissue lost or damaged from illness.

In New York, researchers at Memorial Sloan-Kettering Cancer Center have been using embryonic stem cells to develop bone, cartilage or muscle replacement therapies. And in 2006, a team of researchers from Columbia University and another team from Cornell published research on new ways of turning embryonic stem cells into treatments for Parkinson's disease.

These are just several examples, but the work of these scientists and scientists around the world is inspiring hope for millions in New York and the country living with chronic diseases, or caring for a loved one with these conditions.

In fact, New York is leading the way—letting science, not politics, guide research. My State will soon invest $600 million in stem-cell and regenerative medicine research over the next decade. Thanks to this stem cell funding plan, New York researchers will benefit from expanded resources for all types of stem cell research, including embryonic stem cells, adult stem cells, and somatic cell nuclear transfer. And our economy will benefit as well, as we draw great American scientists and innovators pursuing the next great American scientific innovations.

This is encouraging news for New York, but as a Nation, the leadership vacuum under the Bush administration has left the scientific community holding its breath. The Bush administration has put a ban on certain kinds of research, prohibiting Federal funding for any research on stem cell lines created after August 9, 2001.

Federally-funded scientists are limited to less than 20 stem cell lines, instead of the 78 lines advertised. And not all of these lines are even suitable for research. Some may be contaminated with mouse cells, which can increase the risk of creating strains of diseases which can more easily pass to people. Other problems because of the ban include genetic instability, which is associated with formation of tumors, and practical issues associated with using so few lines—preventing scientists from collecting evidence they need.

While American scientists are being held back, other countries are racing ahead, putting billions of dollars into stem cell science—creating research institutions, clinical centers, and investments of all kinds to attract scientists from the United States and elsewhere who will come to pursue this research.

We are losing ground instead doing what Americans do best: leading the world in innovation, ingenuity, and new ideas. The Bush administration's stem cell policy is impeding science and compromising America's ability to remain at the forefront of biomedical research.

At the same time, the Bush ban is a ban that affects more than 100 million Americans who suffer from Alzheimer's disease, Parkinson's disease, diabetes, muscular dystrophy, cancers as well as for their friends, families, and caregivers.

These are real people I meet every day in New York and across the country. It's an adult with type I diabetes—or a mom whose son or daughter has the disease. It's a senior citizen struggling with Parkinson's disease or a son or daughter with a parent struggling with Alzheimer's.

These are Americans crossing every divide imaginable—hopeful if not for themselves or their children, then for their grandchildren and great grandchildren. My dear friends Christopher and Dana Reeve, whom we lost in the past several years, were eloquent, passionate advocates for this research. Christopher, from his wheelchair, performed his greatest role after his accident, to try and bring the best of American ingenuity to bear on the worst kinds of illnesses and diseases.

I respect my friends on the other side of the aisle who come to the floor with grave doubts and heartfelt concerns. This is a balancing act and we must never lose sight of our ethics and values. But we can strike that balance—and I believe we have in this bill.

When the promise of embryonic stem cell research became apparent in the 1990s, the Clinton administration, working through the National Bioethics Advisory Commission and the NIH, examined the ethical and medical issues involved with such research.

In September 1999, the National Bioethics Advisory Commission released its report, ''Ethical Issues in Human Stem Cells Research.'' In this report, it recommended that research using cells from embryos created, but not used for, infertility treatment, should be eligible to receive Federal funding.

By August of 2000, the NIH had released guidelines for research using stem cells. These guidelines would have allowed funding for research from lines derived from embryos voluntarily donated which would have otherwise been discarded. These recommendations are followed in this bill, which also includes funding for non-embryonic stem cell research, such as work with stem cells derived from amniotic fluid.

As we wade into these new scientific waters, we must always be steered by our values and morals, which is why I have stood against, and voted to ban, human cloning. We must make a strong legal and ethical stand, but we cannot simply stand still as scientific opportunity passes us by and new cures remain just out of reach.

I applaud the leadership of Senators HARKIN, SPECTER, and KENNEDY on this bill. I am hopeful that we can send the Stem Cell Research Enhancement Act to the President, and end the ban on research and hope for Americans looking to us to fund the next great medical discoveries.

Mr. FEINGOLD. Mr. President, as we debate this important legislation regarding stem cell research, we are reminded of the millions of patients and families across America who await treatment and cures for our most deadly and tragic diseases. Scientists believe that over half of Americans over 85 may suffer from Alzheimer's disease, and at least half a million Americans currently have Parkinson's disease. People of all ages suffer from spinal cord injuries, diabetes and other chronic conditions. As we all know, these kinds of serious diagnoses affect not only the patient, but that patient's family, friends, and community.

I am a strong supporter and proud cosponsor of the Stem Cell Research Enhancement Act. I have heard from many of my constituents in Wisconsin in support of this legislation, and I am glad that the Senate is again addressing this issue and responding to the requests of millions across the country. It is important that we approve this legislation as expeditiously as possible, and provide the resources that scientists need to develop treatments and cures for these diseases. Millions of patients and their families across the Nation cannot afford to wait any longer for enactment of this urgently needed legislation.

Researchers believe that they can unlock enormous potential in stem cell research if Congress and the President will only give them the keys. At the University of Wisconsin in 1998, Dr. James Thomson became the first scientist to break into this new frontier by isolating human embryonic stem cells. Since then, researchers at the University have continued to be leaders in this science. But despite the incredible promise this research holds, it has been limited by the President since 2001. As others have noted, even Story Landis, director of the NIH's National Institute of Neurological Disorders and Stroke and interim chair of the agency's stem cell task force, acknowledges that the President's stem cell policy is holding back potential breakthroughs. Congress must act to provide more stem cell lines to scientists so that this research can go forward, without the Federal Government standing in the way.

The Stem Cell Research Enhancement Act would allow federally funded

research to be conducted on stem cell lines derived from excess embryos originally created for in vitro fertilization—IVF—that are no longer needed and are donated by couples for research. It is estimated that there are hundreds of thousands of embryos created for fertility treatments that could be used for research and will otherwise be destroyed. This bill does not interfere with alternative stem cell research, but it supports all avenues of research within the ethical limits Congress has already established. This bill will open doors for scientists to access new, healthy, uncontaminated stem cell lines that are currently off-limits to federally funded research under President Bush's restrictions.

The embryos that could potentially be used for research are those that will never be implanted. Thanks to this legislation, embryos that would otherwise be discarded could be used for research that could save pain and suffering for millions of people, and the lives of millions more.

While I support the Stem Cell Research Enhancement Act, I have concerns about the other bill we are considering today, S. 30. The language in that bill has not been properly vetted through the scientific community, and it is unclear what effect it might have. S. 30 could potentially limit the scope of current research, even further restricting the availability of stem cells for federally funded research. For these reasons, I oppose this legislation.

There is much work that needs to be done to further understand the role that embryonic stem cells can play in providing answers to some of the most troubling medical diseases and conditions that affect so many Americans. The Stem Cell Research Enhancement Act will help our Nation's researchers get closer to unlocking what this research holds by increasing the quantity and quality of stem cells lines available for research.

Embryonic stem cell research is very important to me and to Wisconsin. I am proud that the University of Wisconsin has played a prominent role in stem cell research in this country. I know that my constituents, and Americans across the country, are eagerly awaiting the benefits that this research will provide.

I hope my colleagues will join me in supporting this incredibly important science which would expand our research horizons, and bring hope to so many people.

Mrs. FEINSTEIN. Mr. President, I rise in opposition to the Hope Offered through Principled and Ethical Stem Cell Research Act, S. 30.

My objection to this bill is simple. This legislation will do nothing to overturn President Bush's failed policy that is restricting access to viable stem cell lines.

The United States Senate must be very careful when incorporating scientific concepts, and scientific definitions, into legislation. This bill relies on the notion of so-called ''naturally dead'' embryos to provide viable stem cells. It defines these embryos as:

> having naturally and irreversibly lost the capacity for integrated cellular division, growth, and differentiation that is characteristic of an organism, even if some cells of the former organism may be alive in a disorganized state.

We do not know what the implications of this definition may ultimately be. And the fact is, neither do many scientists. As the leadership of The American Society for Cell Biology wrote yesterday,

> Naturally dead is a scientifically meaningless idea. To our knowledge, there is no scientifically credible way to determine this.

They continue:

> It is critically important that the Senate proceed with caution as it continues its work in the area of scientific policy. Legislation based on inaccurate science could have a detrimental impact on the course of the American biomedical research enterprise.

I ask unanimous consent that this letter be printed in the RECORD.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.).

Mrs. FEINSTEIN. I could not agree more. This debate should be about providing Federal funding, and a consistent policy, for embryonic stem cell research. It is not the place of the U.S. Senate to rely on concepts and definitions that are ''scientifically meaningless.''

The truly important vote will occur on the passage of S. 5, the only legislation that will reverse what the majority of Americans, and the majority of the medical and scientific community believe to be a flawed policy.

S. 30 will very clearly leave in place President Bush's August 9, 2001 Executive Order, which limits Federal funding to stem lines derived before that date. We need to overturn this policy, not affirm it.

I urge my colleagues to join me in opposing S. 30.

EXHIBIT 1

THE AMERICAN SOCIETY FOR CELL BIOLOGY,
Bethesda, MD, April 10, 2007.

Hon. HARRY REID,
Senate Majority Leader, U.S. Senate, Washington, DC

DEAR SENATOR REID: We would like to express our views about the upcoming Senate debate on stem cell research, as the President and Public Policy Committee Chair respectively for the American Society for Cell Biology. Our nonprofit, professional society of more than 11,000 members includes many of the leading scientists working in this area.

As you know, it is critically important that science policy be carefully crafted to allow ethically sound scientific research to proceed. This is particularly difficult to do when the science behind the policy is as complicated as in the current policy debate on stem cell research.

We are particularly concerned about a major provision of S.30, the ''Hope Offered through Principled and Ethical Stem Cell Research Act.'' The expressed purpose of S.30 is to ''promote the derivation of pluripotent stem cell lines without the creation of human embryos for research purposes and without the destruction, discarding of, or risk of injury to a human embryo or embryos other than those that are naturally dead.''

S.30 relies on the false premise that scientists can determine whether a human embryo is ''naturally dead.'' However, naturally dead is a scientifically meaningless idea. To our knowledge, there is no scientifically credible way to determine this. In fact, we think that to establish sufficiently precise scientific or clinical standards about the quality of embryos at the very early stages of development would require experiments that the bill itself would not permit.

It is critically important that the Senate proceed with caution as it continues its work in the area of science policy. Legislation based on inaccurate science could have a detrimental impact on the course of the American biomedical research enterprise. Not only do we risk driving research and researchers to other countries more interested in cutting edge research but we also delay the day when our fellow Americans who suffer from some of the most debilitating diseases finally realize the benefits of scientific research.

Sincerely,

BRUCE ALBERTS,
President.

LARRY GOLDSTEIN,
Chair, Public Policy Committee.

Mr. DURBIN. Mr. President, today we made an important step forward for the hope of millions of patients and their families.

Unfortunately, with this important step forward, there was also a small step backward.

I had initially stated that I would vote in favor of S. 30, but after carefully reviewing the language, I decided to vote against it.

I will ask to have printed in the RECORD a letter from the Joint Steering Committee on Public Policy that supports S. 5 and opposes S. 30.

The Joint Committee is a group made up of the American Society for Cell Biology, the American Society for Clinical Investigation, the Genetics Society of America, Science Service, and the Society for Neuroscience.

Many of us here believed that S. 30 was a harmless bill.

After all, it is an initiative that would show we are supportive of all forms of embryonic stem cell research.

And I believe that some still feel that way.

But after hearing from a variety of research organizations and scientists, I have serious reservations.

After carefully reviewing the legislation, it is now clear that S. 30 sends the wrong message to the scientific community.

S. 30 puts forth a number of scientific issues that negatively position the scientific debate around what constitutes life and death and raises concepts that may not even be scientifically defined.

As elected officials discussing complex science issues, we are already in somewhat unfamiliar territory.

If we are to delve deeper into this discussion and the details of it, we need the scientific community on our side.

I stand for the advancement of medical research and I hope that this vote has made it clear.

Mr. President, I ask unanimous consent to have the aforementioned letter printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

JOINT STEERING COMMITTEE
FOR PUBLIC POLICY,
Bethesda, MD, April 9, 2007.

Hon. HARRY REID,
Senate Majority Leader,
U.S. Senate, Washington, DC.

DEAR SENATOR REID: On behalf of the Joint Steering Committee for Public Policy (JSCPP), I would like to express our support for S. 5, the ''Stem Cell Research Enhancement Act of 2007.'' S. 5 would expand the current federal policy regarding federally funded embryonic stem cell research to allow the use of cells derived since August, 2001, from embryos originally generated for reproductive purposes that would otherwise be destroyed.

I would also like to express the JSCPP's opposition to S. 30, the ''Hope Offered through Principled and Ethical Stem Cell Research Act.'' The purpose of S. 30 is to ''promote the derivation of pluripotent stem cell lines without the creation of human embryos for research purposes and without the destruction, discarding of, or risk of injury to a human embryo or embryos other than those that are naturally dead.''

S. 5 represents an important step forward for human embryonic stem cell research, a new field that offers great promise for the replacement of damaged cells, the understanding of the mechanics of disease, and the development and testing of new drugs. Unfortunately, current federal policy, in place since 2001, has not kept pace with the speed of scientific discovery and is today of limited value to the scientific community, a position endorsed by the Director of the National Institutes of Health, Elias Zerhouni, at a recent Senate appropriations hearing.

While the JSCPP is supportive of S. 5, we strongly oppose S. 30. S. 30 is proposed as an alternative to S. 5, but contains no substantial measure to reverse current limitations on embryonic stem cell research and simply endorses research avenues that are already open under current law. We oppose the bill because it contains unnecessary provisions and places confusing and short-sighted restrictions on biomedical research.

The prohibitions in S. 30 against the use of government funds to derive stem cells with methods that generate embryos for research purposes or that involve the destruction of embryos are unnecessary, because the annual Departments of Labor, Health & Human Services and Education Appropriations bill has, for many years, included the same prohibitions.

Furthermore, the central provision of S. 30 appears to allow research on embryos considered to be ''naturally dead.'' We are particularly concerned about this requirement because the term ''naturally dead'' is not a scientific term, and there are no scientific or clinical standards for determining the quality of embryos at the early stages of embryonic development.

We are also concerned about the provision in S. 30 that requires a priority to be placed on research ''with the greatest potential for near-term clinical benefit.'' Not only is it impossible to know the benefits of research in advance, but limiting the scope of research in this way places a muzzle on the scientific process, placing short-term incremental advances ahead of the more challenging goals of preventing or curing diseases such as diabetes.

For these reasons, we believe that passage of S. 30 would be a significant step backwards for human embryonic stem cell research and for biomedical research in America. Therefore, we urge a ''yea'' vote on S. 5 and a ''no'' vote on S. 30.

Sincerely,

HAROLD VARMUS, MD,
Chair, Joint Steering Committee for Public Policy.

Mr. ISAKSON. Will the Presiding Officer give us the allocation of time remaining?

The PRESIDING OFFICER. The Senator from Iowa has 31 minutes remaining.

Mr. ISAKSON. Thirty-one minutes?

The PRESIDING OFFICER. Thirty-one. The Senator from Kansas has 25 minutes. The Senators from Minnesota and Georgia have 45 minutes.

Mr. ISAKSON. With all due respect, Mr. President, we reached an agreement at the end of the previous time that we would equally divide 2 hours 30 minutes between Senator HARKIN, Senator BROWNBACK, Senator COLEMAN, and Senator REID. We are in the fourth of those 30-minute blocks now, which would be ours, and then we go to four 10-minute blocks equally divided; is that correct?

I believe I am correct. How much of our time do we have left of the 30-minute block?

The PRESIDING OFFICER. Forty-five minutes for the Senator from Georgia.

Mr. ISAKSON. Mr. President, I am pleased to yield 10 minutes to the distinguished Senator from Oklahoma, Mr. COBURN.

The PRESIDING OFFICER. The Senator from Oklahoma.

Mr. COBURN. Mr. President, I listened with interest to the Senator from New York. As a practicing physician and somebody who has delivered over 4,000 children, I cared for both toddlers and young adults with type 1 diabetes. There is nobody who doesn't want to see that disease fixed. The problem is, we shouldn't promise things we don't know are accurate.

What we do know is that yesterday on CNN, an article was released from JAMA showing the treatment of 13 young Brazilians who had type 1 diabetes who are now free from using exogenous insulin. They are on no medicine whatsoever and their sugar is totally controlled. That is one step going forward in all the areas of medicine.

The other comment I will make before I make my final points is, if you talk to anybody in the area of research on Alzheimer's—Alzheimer's, and we heard it time and time again, is a devastating disease for individuals who have it, and it is a devastating disease for families who care for their loved ones with it—I don't know of anybody in embryonic stem cell research or in research in medicine by themselves who has great hopes for a cure of Alzheimer's with embryonic stem cells. We have heard that claim time and time again. It is not a great hope for Alzheimer's. There is hope. There is beta secretase, which is an enzyme that causes Alzheimer's to be laid down. There are great medicines coming forward. Some are in trials in primates right now that tend to stop Alzheimer's in its tracks.

We ought not to be promising things we don't know or are not realistic in terms of Alzheimer's. That is the case.

I want to sum up where we are, the differences between the two bills. One bill, S. 5, has lots of positives in it. We hear it is not going to destroy any other embryos, there is going to be a grandfather of the embryos that have been created since. We heard the Senator from New York say something different. We heard the Senator from California yesterday talk about the 400,000 embryos that are frozen today, of which only 2.8 percent are available and less than that number—so less than 250 lines—could totally be created out of all the embryos that are available in this country today.

The answers are kind of sleight of hand. To have an effective embryonic stem cell program, other than what is provided in S. 30, means we are going to use Federal taxpayer dollars, indirectly or directly, to destroy embryos. You can say you are not, but the fact is that will happen.

What are the positives of S. 30? The positives of S. 30 are that it looks at everything. It looks at all the new and upcoming methods. One is altered nuclear transfer. No. 1, you don't destroy any embryo, you don't create an embryo, but yet you get identical cells to what an embryonic stem cell would be, totally pluripotent, totally capable of doing everything an embryonic stem cell can do.

Why is there resistance to that? Why would there be any resistance to that? There shouldn't be.

The second point is what we call germ cell pluripotent stem cells. Those are made from the testes and ovaries of us, each of us, and we can have treatments designed for ourselves. Every tissue type in the body has now been produced from germ cell pluripotent stem cells, either ovarian or testicular, again, applying the same pluripotent stem cells you get from an embryo, but you never destroy a life.

My friend from Minnesota, one of the coauthors of this bill, makes a great point. Whatever happens at the end of the day—right now this glass of water represents what is happening on embryonic stem cell research with Government funds in this country. There is a whole lot of other research going on with embryonic stem cells outside the Government. It has not dead stopped. As a matter of fact, it is advancing forcefully without Government money. But this represents what is there. If S. 5 is passed out of this body and the House, this is what we will see next year: the same amount, because this bill is going to be vetoed.

However, if S. 30 is passed, what we will see is this much research, a doubling of the research next year. So one says help people play the political game when we know it is going to be

vetoed. S. 30 says let's do something real. Let's give an answer to the hope. Let's double it up and let's do it in a way that is an ethically good way.

The final point I wish to make is to anybody who wants us to do embryonic stem cell research, anybody who has a family member with a chronic disease, anybody who has a child with diabetes, anybody who has any need that has hope coming from ''embryonic stem cell research,'' the question I put forward to them is this: If we can show you the science is going to give us exactly the same results with never destroying an embryo, what would your choice be—destroy an embryo and get the results or do not destroy an embryo and go one of the multitude other ways to accomplish exactly the same purpose?

That is the real question that is facing this body. That is the question the American people ask. The science is 2 to 3 years ahead of the debate in this body today.

A lot of times my colleagues accuse me of not making much sense on the floor when I talk about these issues because it is a medical issue, it is a scientific issue. I am a doctor. I understand the science, so I tend to not use the words as plainly as I should. But the ethical question still arises: Do you want a doubling of the research to go forward and answer the very human need that is out there or do you want to play the political game and have exactly what we have today?

I say to Senator HARKIN, that is what will happen if S. 5 goes through. It is going to be vetoed. It will not be overridden in the House. Or we can have S. 30 that does as much or more than S. 5 and we will see a difference for the American people.

The hope my colleagues talk about will be realized when S. 30 gets passed, when S. 30 gets signed. The President has said he will sign it. It makes available everything we will need and still accomplishes the same goals but does it twice as fast. That is the real question: Do we want to play politics with this issue? Do we want to say somebody's legitimate position of valuing life, that they have an illegitimate position because they value life at the expense of somebody with chronic disease, or can they value life, come with an answer that actually accomplishes the same purpose in a better timeframe with better results with S. 30? That is the real question for us.

I understand the political game we are playing. I understand the diseases. But when you read the basic raw research that is going forward today, we are not even close to what is happening, we are not even talking about what is happening out there.

Final point. Make sure you understand that if you believe in embryonic stem cell research as a viable ethical alternative, you also have to believe in cloning because the only way you will get a treatment that is good for you without rejection, without rejecting the very treatment that is being given to you, is for you to clone yourself. That is the dirty little secret nobody wants to talk about in this debate because once we accomplish with true embryonic stem cells versus altered nuclear transfer, any treatment will require antirejection drugs or you having to clone yourself.

The language is very specific. There is no cloning as far as implanting into a uterus, but it doesn't mean you don't clone yourself and destroy yourself to meet a need for you.

It is a very complicated ethical issue about which we ought to be very clear. It is not just destroying embryos. It is going the next step now to have an effect from that treatment.

I believe there will be good treatments come out of embryonic stem cell research. I don't have any doubt about that. I believe exactly those same treatments will come and be better from altered nuclear transfer, from dedifferentiation, which is a term that says you take a cell that is more mature and dedifferentiate it back to a pluripotent cell, or from germ cells, either ovarian or testicular.

We can accomplish the desires of everybody who is hurting in our country today who has a hope and do it in a realistic way with S. 30 that will deliver the goods, deliver taxpayers' dollars to make a difference. S. 5 will deliver nothing, nothing for at least 2 years, because this President won't sign it.

So the consequence and the question that comes back to us is: Are we going to do something that is meaningful or are we going to play the political game that in the long term has no meaning, at least for the next 2 years?

I yield back my time to the Senator from Georgia.

Mr. ISAKSON. Mr. President, I thank the Senator from Oklahoma.

I yield up to 15 minutes of our time to the distinguished Senator from Minnesota, Mr. COLEMAN.

The PRESIDING OFFICER. The Senator from Minnesota.

Mr. COLEMAN. Mr. President, I thank my colleague from Oklahoma, who brings a physician's perspective. We hear so often on the floor of the Senate that we need to look in the eyes of young kids with juvenile diabetes and say: Are we doing all we can do? My colleague from Oklahoma has dealt with that on a regular basis. He stands with me, and I thank him for his support.

In the end, there is a practical conclusion, as he demonstrated with the glasses of water. If you want an answer, if you want to look those kids in the eyes, talk to the families of folks with ALS or heart disease, if you support S. 30, you can look them in the eye and say: Today I have done what I can do to move the science forward, to have additional Federal support for embryonic stem cell research but research which, in the end, is unifying research.

Dr. William Hurlbut, who is one of the authors of a technique known as altered nuclear transfer, used a phrase that I borrowed. It is an island of unity and a sea of controversy. That is what S. 30 offers, an island of unity and a sea of controversy. There is disagreement in this country about the use of Federal dollars for the destruction of a human embryo. That is a reality. In the end, scientific advancement should be something that is unifying. It shouldn't be tearing this country apart. You shouldn't worry, if you are going into a hospital for some kind of treatment, whether there is some moral line that has been crossed for you as an individual. You shouldn't have to do that. We shouldn't put people in that position.

The good news is we don't have to. It is fascinating. I think the science has gotten ahead of the politics. I have no doubt, as I listened to this debate, these are people of good will on both sides of this debate, supporting both proposals, but I believe the same ultimate kind of vision to improve quality of life, to enhance scientific research, to put an end to debilitating and threatening disease and illness, is the kind of common bond we have, people of good will.

I suppose a number of years ago, individuals of good will, good moral background, religious background, may have come to a conclusion that they would support the destruction of a human embryo for the opportunity to do good today for someone who is here. It is a line some of us can't cross. We bring deeply held moral perspectives to this issue. I understand others of good faith and strong character, solid religious background and belief, say this is the line, this is the right thing to do.

I heard my colleagues on the other side quote scriptures and pastors and others—my friends, of good will, and good heart. In the past, that may have been the only path to where we wanted to go.

The Clinton administration looked at this. In fact, this is the language they used. In 1999, President Clinton's National Bioethics Advisory Commission issued a report entitled ''Ethical Issues in Human Stem Cell Research'' acknowledging that a week-old human embryo is a form of human life that deserves respect. The Commission stated:

> In our judgment, the derivation of stem cells from embryos remaining following infertility treatments—

These are the embryos we are talking about here, IVF—

> is justifiable only if no less morally problematic alternatives are available for advancing the research.

Science has moved ahead of where we were in 1999. I was on the phone a little while ago with a Dr. Landry from, I believe, Columbia University. Dr. Landry talked about a stem cell line coming from dead embryos that has all the capacity, pluripotency of the stem cell lines from fertility clinics. So a ''less morally problematic alternative'' is available.

My friend and colleague from Georgia, the coauthor of this legislation,

knows from Georgia experience that scientists worked on dead embryos. I thought about it, and I believe it is part of the 21 lines the President authorized for embryo research. The work is being done. The reality is there are cell lines available today that are not eligible for Federal funding. That is because we have a policy that says no Federal funding for embryo stem cell research. But if we pass S. 30, and S. 30 gets signed into law, then we have available Federal funding for embryonic stem cell research that would not be available today.

That is then ''morally less problematic'' because it does not involve the destruction of a human embryo.

When we talk about a dead embryo, my colleague from Georgia has done a very good job. My colleagues may have said: It is a dead embryo. What can you get out of a dead embryo? Let me explain two concepts. They are at the heart of this debate. I am not a scientist, but I have learned a lot about pluripotency, the capacity of a cell to give rise to many different cell types. Embryonic stem cells, those that have come from in vitro fertilization clinics, they have pluripotency. They have this elastic capacity to recreate any kind of cell. So maybe sometime in the future you can create stronger heart muscles. Today, in fact, with some types of stem cell research, that is being done. Maybe you can grow limbs. Maybe you can cure ALS. There is an incredible capacity, pluripotency.

There is also this concept of totipotency. Totipotency is the capability of a zygote or other cell to develop into a complete, integrated human being. The line we are talking about today between S. 5 and S. 30 is the line between pluripotency and totipotency. We all support research that will provide for pluripotent stem cells, pluripotent cells that have the capacity to be almost anything.

The dividing line, though, is whether you have totipotency, so with a human embryo, cells that are involved in a fertility clinic—I am going to switch charts and talk about a couple of other techniques that involve pluripotency but not totipotency. What we look at with dead embryos are cells that are pluripotent. I don't know if it is a great analogy, but even after death we can harvest organs that have the ability to serve the function you want them to serve. So dead embryos are embryos that have no totipotency but have pluripotency. You get pluripotent cells.

The other approach is an approach known as altered nuclear transfer. That, by the way—I say ''the approach.'' There are a number of other approaches out there. My colleague from Oklahoma talked about that. I think he talked about dedifferentiation, talked about germs—there are a number of different procedures and techniques that have strong scientific support that allow us to produce pluripotent cells without totipotency. They allow us to produce embryonic stem cells that have all the capacity for research that gives the hope we are talking about without creating a human embryo that does not involve, then, the taking of human life; that does not involve the moral line that many Americans feel is there.

Not all. There is a difference in this. That is why I am saying, what S. 30 does is it gives us this island of unity in the sea of controversy. What it does is allow all of us—and I do hope all my colleagues, wherever you are on this issue—support for S. 30. Why would you be opposed to Federal funding for embryonic stem cell research that advances us?

My colleague from Oklahoma used the two glasses of water. If you support S. 5, all you are going to get tomorrow—in January 2008, S. 5 passes. It passes in the Senate, passes in the House, it is vetoed. We have this much right now—I believe it is about $130 million. That is what this glass represents in research, embryonic stem cell research. Those are the 20-something lines left the President authorized.

In January of 2008 you are going to get $132 million of federally funded stem cell research. But if we pass S. 30, what we have then is the opportunity for research in a range of other areas, perhaps doubling and maybe more—I would hope much more—of stem cell research, or pluripotent stem cells, to get the capacity to do all the treatments and provide the hope.

We are, by the way, a long way away in reality from human treatments, but it is hope. That is what this bill is, this is the HOPE bill.

One of the other mechanisms we talked about is altered nuclear transfer. Just to explain, in the natural fertilization process, biology 101, you have the sperm, you have the egg, you get the fertilized egg, and you get the embryo.

In the clone what you have is the egg cell, you enucleate it—you take out the center. This may come from a fingernail or skin, whatever, a cell with all the DNA, and you insert it into this enucleated egg. You activate it and then you get an embryo. I think that is the way Dolly the sheep came about.

By the way, my colleague from Oklahoma talked about this. If we are going to do stem cell research from here, and we are going to take this embryo and we are going to create stem cells and we put that into you or me, you are going to have an immune reaction, and your whole life—if you put this in you, you are, for your whole life, going to have to deal with immune reaction suppression and the drugs. The only way around that is the Dolly approach. If you create stem cells from your own cells there is no immune reaction.

We are not talking about that, although there are those of us who raise the concern: How do you get ultimately where you want to go without that possibility?

Another way is the altered nuclear transfer. You take the genetic material, the somatic cell, fingernail or something, and what you do before you insert it into this enucleated egg is touch off a trigger mechanism that shuts off the ability to create the embryo, but it still creates an inner cell mass with pluripotent cells—the capacity of a cell to give rise to many different types of cells. Do all the research you want.

So S. 5 provides funding for new stem cell research. It provides the opportunity to do all that one wants to do without crossing the moral line. Why wouldn't we get there?

My great fear is that what will happen this year is what happened last year. In the Senate there was a bill, the Specter-Santorum bill, which, by the way, did not provide for all that we have in S. 30. It did not provide for the dead embryo research. I think it may have provided for some sort of ANT. The good news is that is included in S. 5, but S. 5 is going to be vetoed so that doesn't go anywhere.

Last year that passed, 100 to 0, a bill with some alternative measures. But, again, we have gone way beyond last year, this year, in terms of the science.

The House refused to hear it. They took an all-or-nothing approach: If you don't support the destruction of a human embryo to do stem cell research we are not passing anything. Where is the hope in that? As you look at this I challenge my colleagues on the other side of the aisle to tell their colleagues in the House: Give hope, the hope we have talked about on this floor, the hope we all agree on, the hope that there is just consensus on that we want to move the research forward. Do not let some kind of politics that I cannot understand stop us from moving forward with the opportunity to move research that can produce hope.

There are many scientists who have kind of said: Yes, we looked at ANT and we know it can work and we need to put our efforts into that. I will read a couple of quotes:

> Research results suggest that altered nuclear transfer may be able to produce human pluripotent stem cells—in a manner that is simpler and more efficient than current methods.

That is by Hans Scholer, chair of the Department of Cell and Developmental Biology at the Max Planck Institute in Germany.

> Recently, multiple labs in the United States and from around the world have published or reported experiments in which adult cells were converted not to embryos but directly to pluripotent embryonic-like cells. The resulting cells were virtually indistinguishable from embryonic stem cells derived from embryos. The techniques used included altered nuclear transfer, cell fusion and chemical reprogramming. The results were obtained from top scientists in the field and published in the best journals.

That was by Markus Grompe, M.D., Oregon Stem Cell Center.

It is fascinating, those scientists that support just embryonic stem cell research without anything, they will tell

you nothing else works; this is the whole ball of wax; my way or the highway. Then you have scientists who support these alternatives who say: Yes, this is the best way to go.

Maybe it is about Federal funding. Maybe if you don't believe your way is the only way you are not going to get Federal dollars. We have to get past the politics. We have to get past the petty scientific divisions and simply look at what we have out there and embrace and seize the opportunity to move forward in a way that is cohesive, that gets this Nation outside of the culture wars, outside of the battles over Federal funding for the destruction of human life. Put it aside. We don't have to go there today. Science is offering us a better path.

The PRESIDING OFFICER (Mr. BROWN). The time of the Senator has expired.

Mr. COLEMAN. I urge my colleagues to take a look at S. 30, regardless of where you are on S. 5. This is a bill that deserves unanimous support. In the end, let's work on our friends and colleagues in the House to pass the law so that we have, in the end, one the President will sign, one which offers and delivers true hope.

I yield the floor.

Mr. ISAKSON. How much of our time remains?

The PRESIDING OFFICER. The Senator from Georgia has 17 minutes.

Mr. ISAKSON. I will acknowledge, given the agreement we previously made, I think I will only take 5 of those. I recognize myself for 5 minutes.

The PRESIDING OFFICER. The Senator from Georgia is recognized.

Mr. ISAKSON. I acknowledge the patience of the Presiding Officer. I know the Presiding Officer was in the chair last night when the Senator from Iowa and I had an exchange. I want to repeat some of what was said, so I apologize to the distinguished Presiding Officer, but in the end I want to try to synthesize what got me to the point of being a part of S. 30.

In August 2001, when the directive came down, I started learning about stem cells. When the veto took place last year, I wondered what more I needed to know to try to find a way to deal with the concerns of some but the compassion of everyone. I stumbled upon a professor at the University of Georgia, Dr. Steven Stice. I really didn't stumble upon him; one of my interns, an honor student, directed me to him. He said he was doing research in this area.

As it turned out, he was operating three stem cell lines, lines BGO1, BGO2, and BGO3. So I went to the university and spent 2 days going through what their research team was doing and the way in which they were derived. I came to learn that Dr. Stice and his team, like teams in California, Wisconsin, and other States that have since derived embryonic stem cells this way, derived them from what is known as naturally dead or arrested embryos. Those are embryos that after 7 days following in vitro fertilization stopped cellular division. The embryo itself is clinically dead, as is a human being who is brain dead, although all their other organs are working. But contained within that embryo are stem cells. So it has gone through a natural death, not one at the hands of a doctor or anyone else, and it produces these stem cells.

After reading everything I could on it, I want to read one sentence from just one study which verified the pluripotency, the undifferentiation, and the independence of those lines:

> Lines BGO1, BGO2, and BGO3, human embryonic stem cells are, therefore, independent, undifferentiated and pluripotent lines that can be maintained without an accumulation of karyotypic abnormalities.

It took a long time to practice those last two words and say them right, but what that practically means is exactly what we all seek.

That is, embryonic stem cells that have the full potential for research, to answer the hope all of us in this room have expressed today, can, in fact, be derived from embryos that are not destroyed by the human hand but through the natural process of the life cycle.

So I asked myself this question: Well, if this is a legitimate debate—which it is a legitimate debate—if science has found there is a way to derive these stem cells without the destruction of the embryo, and if—which is true—5 of the 21 lines currently exempted by the Presidential order of 2001, are, in fact, 5½ years of study side by side with stem cells derived by destroying the embryo, and if we have clear evidence they are undifferentiated, they are pluripotent, and they do not have abnormalities, then this is the answer to thread the needle to solve the problem.

The White House has acknowledged they will sign the bill. So with respect for every Member of this Senate who has eloquently spoken on behalf of the hope of furthering research, I do not know what the results of the research are going to be, but I know this: If we do not do it, we will never know, and if there is a way to do it and accelerate it and thread the needle, which this does, then I submit we should do it.

I would encourage all of my colleagues to support S. 30.

I acknowledge the tremendous work of the Senator from Minnesota and others who have helped. I appreciate the time allotted to us in this debate. In the end, I think the most used word in the last 2 days has been ''hope.'' There is now a hope that we actually bring about the reality of scientific development for the cure of deadly and terrible diseases and do so in a way that recognizes the natural process of the life cycle and the advancement of the science.

With that, I yield back our time in this cycle.

Mr. President, my understanding is—I am going to repeat this—it is my understanding that we now have a period of 30 minutes that is open, at which time, following that, each of the four designees will have a closing 10 minutes.

I see the distinguished Senator from Kansas is on the Senate floor. My understanding of that 30-minute division, Senator BROWNBACK, is you would have up to 7½ minutes of that 30, and if—I would ask—I am going to try this. I ask unanimous consent that the next 30 minutes be divided, with 15 minutes under the control of Senator HARKIN, 7½ under the control of Senator BROWNBACK, 7½ under the control of myself and Senator COLEMAN, and then the remaining 40 minutes would be equally divided between the four designees: Senator HARKIN from Iowa, myself and Senator COLEMAN, Senator BROWNBACK, and Senator REID, and then lastly, the leaders will have 30 minutes equally divided.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. ISAKSON. From what I understood of that agreement, I think the Senator from Kansas would have 7½ minutes, then the Senator from Iowa would have 15, then I would have 7½. Is that fair?

The PRESIDING OFFICER. The Senator from Kansas is recognized for 7½ minutes.

Mr. BROWNBACK. Mr. President, if the Chair would please remind me when I have a minute left of my time.

The PRESIDING OFFICER. The Chair will do that.

Mr. BROWNBACK. I wish to start by entering into the RECORD four documents and briefly covering them as much as possible. I ask unanimous consent that all four of these documents appear directly after my testimony.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See Exhibits 1 through 4.)

Mr. BROWNBACK. This first one is the list of 72 current clinical applications using adult stem cell therapy. No ethical problems on these. Actually, the list now is 73. I will cover that in just a minute, but I want to get that in.

I want to back this letter up, or this statement up, with a letter that appeared in the magazine Science, January 19, 2007, that was refuting the article—that was a letter put forward by other individuals questioning this level of adult stem cell therapy and treatment.

Then this letter which was in the Journal of Science was backed up by the third document we have here, which is a list of 14 pages of the peer-reviewed scientific articles on adult stem cell therapies and the benefits those have produced.

Then the final document we have here in this stack that I will be putting forward is the article that just appeared out even today from JAMA, the Journal of American Medical Association, on Type 1 juvenile diabetes being treated with the use of adult stem cells. The results—I am just going to

read these, because they are just so phenomenal, from this JAMA article: During a 7- to 36-month followup, 14 patients became insulin free; one for up to 35 months with this treatment.

This was an adult human stem cell treatment. One patient was not able to become insulin-independent.

The reason I cite that is it is such an exciting set of results. People have been talking on the floor a great deal about curing diabetes. Here we have a JAMA article, as I have noted to my colleagues earlier. The unfortunate thing is the actual test took place in Brazil instead of the United States even though it was designed and much of it was done by U.S. scientists at Northwestern University and other places. The work should be being done in the United States.

Point one being, we don't have to go there with the taxpayer funding destroying this young human life. I would hope my colleagues would say that in and of itself is enough information for me to say we do not need to cross this ethical boundary. The ethical boundary we are talking about yet again is using taxpayer dollars to fund the destruction of human life so we can research on these entities. Some would refer to it as potential for human life; that is human life, so we can research on it.

Do we want to cross that ethical boundary that has everybody in somewhat of a question of whether they want to do this or not? I would submit, No. 1, we do not need to; we have routes to go that work. No. 2, we should not do that in researching on human life because of the respect we have and the dignity afforded to each and every human life at all stages, at all places, for the human existence this individuals has.

Proverbs tell us this: There is a way that seems right to a man, but its end is the way of death. There is a way that seems right to a man, but its end is the way of death.

That would seem to really highlight this debate—the way that seems right to a man. Let's just research on these embryos; they are going to be disposed of anyway. Why not do it instead of throwing them away? Why not do it instead of having them being adopted? Why not do it? Why not research on someone who is on death row? Why not?

There is a way that seems right to a man, but its end is the way of death. Well, we shouldn't because it does continue that continuation of us breaching human dignity—at a very early stage, granted, but nonetheless human by all definition of what a human species and an individual is. It does breach that, and we should not go there with taxpayer dollars.

As I have noted to my colleagues, it is legal to do in the United States. States can fund it, private individuals can fund it. I have noted to my colleagues that private individuals are not funding it. They are not funding it because it is speculative, it is not producing results, and it is producing tumors.

I have entered into the RECORD previously a large set of different studies in various areas done by various groups. These embryonic stem cells are producing tumors. That is what is taking place. There is a way that seems right to a man, but its end is death. Do we want to put tumors in individuals? Is that the route we are going forward with? I don't think so. I don't think we should.

I emphasize as well to my colleagues that we have another route to go on this that we can work on together. I would hope we could work on the amniotic fluid and banking of amniotic fluid. I think that would be an important key route for us to work together.

I am disturbed that at this point in time in the legislative session, the first half of the year after an election, we are spending this amount of time on a topic that is going to be vetoed—S. 5 is going to be vetoed; unlikely that the veto override is going to occur; maybe it is going to be able to happen but unlikely—when we have other routes we can work on that will work and will produce results. Are we going to continue this effort for division? It is all about dividing. It is all about causing a fight and somebody scoring some political points, when we have a hopeful route that is producing results that we can work on together, that we can get more funding for, and everybody wants cures and we can get more funding for this route which is working, and we can start a new area in amniotic fluid and placenta or we can go along with my colleagues from Georgia and Minnesota on a route upon which we can agree.

The PRESIDING OFFICER. The Senator has 1 minute remaining.

Mr. BROWNBACK. I think we can do those things. Yet we continue down this route of division. Why would we do that when in the balance sit patients in this country and around the world who seek our help? I have shown you many pictures of those who have gotten help but need more and are having to travel overseas for these treatments. Let's not force them to do that.

Let's stop the politics of division. Let's start working together and have a culture that respects human dignity. We can do that. Reject S. 5.

EXHIBIT 1

72 CURRENT HUMAN CLINICAL APPLICATIONS USING ADULT STEM CELLS

(LIST UPDATED MARCH 2007)

ANEMIAS & OTHER BLOOD CONDITIONS

Sickle cell anemia
Sideroblastic anemia
Aplastic anemia
Red cell aplasia (failure of red blood cell development)
Amegakaryocytic thrombocytopenia
Thalassemia (genetic [inherited] disorders all of which involve underproduction of hemoglogin)
Primary amyloidosis (A disorder of plasma cells)
Diamond blackfan anemia
Fanconi's anemia
Chronic Epstein-Barr infection (similar to Mono)

AUTO-IMMUNE DISEASES

Systemic lupus (auto-immune condition that can affect skin, heart, lungs, kidneys, joints, and nervous system)
Sjogren's syndrome (autoimmune disease w/symptoms similar to arthritis)
Myasthenia (An autoimmune neuromuscular disorder)
Autoimmune cytopenia
Scleromyxedema (skin condition)
Scleroderma (skin disorder)
Crohn's disease (chronic inflammatory disease of the intestines)
Behcet's disease
Rheumatoid arthritis
Juvenile arthritis
Multiple sclerosis
Polychondritis (chronic disorder of the cartilage)
Systemic vasculitis (inflammation of the blood vessels)
Alopecia universalis
Buerger's disease (limb vessel constriction, inflammation)

BLADDER DISEASE

End-stage bladder disease

CANCERS

Brain tumors—medulloblastoma and glioma
Retinoblastoma (cancer)
Ovarian cancer
Skin cancer: Merkel cell carcinoma
Testicular cancer
Lymphoma
Non-Hodgkin's lymphoma
Hodgkin's lymphoma
Acute lymphoblastic leukemia
Acute myelogenous leukemia
Chronic myelogenous leukemia
Chronic myelomonocytic leukemia
Juvenile myelomonocytic leukemia
Cancer of the lymph nodes: Angioimmunoblastic lymphadenopathy Multiple myeloma (cancer affecting white blood cells of the immune system)
Myelodysplasia (bone marrow disorder)
Breast cancer
Neuroblastoma (childhood cancer of the nervous system)
Renal cell carcinoma (cancer of the kidney)
Soft tissue sarcoma (malignant tumor that begins in the muscle, fat, fibrous tissue, blood vessels)
Ewing's sarcoma
Various solid tumors
Waldenstrom's macroglobulinemia (type of lymphoma)
Hemophagocytic lymphohistiocytosis
POEMS syndrome (osteosclerotic myeloma)
Myelofibrosis

CARDIOVASCULAR

Acute Heart damage
Chronic coronary artery disease

IMMUNODEFICIENCIES

Severe combined immunodeficiency syndrome
X-linked lymphoproliferative syndrome
X-linked hyper immunoglobulin M syndrome

LIVER DISEASE

Chronic liver failure
Liver cirrhosis

NEURAL DEGENERATIVE DISEASES & INJURIES:

Parkinson's disease
Spinal cord injury
Stroke damage

OCULAR

Corneal regeneration

WOUNDS & INJURIES

Limb gangrene

Surface wound healing
Jawbone replacement
Skull bone repair

OTHER METABOLIC DISORDERS

Hurler's syndrome (hereditary genetic disorder)
Osteogenesis imperfecta (bone/cartilage disorder)
Krabbe Leukodystrophy (hereditary genetic disorder)
Osteopetrosis (genetic bone disorder)
Cerebral X-linked adrenoleukodystroph

''It is nearly certain that the [human] clinical benefits of the [embryonic stem cell] research are years or decades away. This is a message that desperate families and patients will not want to hear.''—Science, June 17, 2005

EXHIBIT 2

TREATING DISEASES WITH ADULT STEM CELLS

In their letter ''Adult Stem Cell Treatments for Diseases?'' (28 July 2006, p.439), S. Smith et al. claim that we misrepresent a list of adult stem cell treatments benefiting patients. But it is the Letter's authors who misrepresent our statements and the published literature, dismissing as irrelevant the many scientists and patients who have shown the benefits of adult stem cells.

We have stated that adult stem cell applications have ''helped,'' ''benefited,'' and ''improved'' patient conditions. Smith et al.'s Supporting Online Material repeatedly notes patient improvement from these cells. We have never stated that these treatments are ''generally available, ''cures,'' or ''fully tested in all required phases of clinical trials and approved by the U.S. Food and Drug Administration (FDA).'' Some studies do not require prior FDA approval, and even the nine supposedly ''fully approved'' treatments aclmowledged by Smith et al. would not be considered ''cures'' or ''generally available'' to the public at this stage of research.

The insistence that no benefit is real until after FDA approval is misplaced. Such approval is not a medical standard to evaluate patient benefit, but an agency determination that benefits outweigh risks in a broad class of patients. Physicians and patients use an evidentiary standard. Our list of 72 applications, compiled from peer-reviewed articles, documents observable and measurable benefit to patients, a necessary step toward formal FDA approval and what is expected of new, cutting-edge medical applications.

Smith et al. also mislead regarding citations for testicular cancer and non-Hodgkin's lymphoma, referring to ''[t]he reference Prentice cites . . .'' as though only one reference existed in each case, and not mentioning four other references that, according to their own SOM, show ''improved long-term survival'' of patients receiving adult stem cells. There are currently 1238 FDA-approved clinical trials related to adult stem cells, including at least 5 trials regarding testicular cancer and over 24 trials with non-Hodgkin's lymphoma. They also disregard studies showing successful stimulation of endogenous cells for Parkinson's.

The ethical and political controversy surrounding embryonic stem cell research makes scientific claims especially prone to exaggeration or distortion. All such claims should receive careful scrutiny, as recently acknowledged by the editors of this journal after two articles claiming human ''therapeutic cloning'' success were revealed to be fraudulent. This scrutiny should be directed equally to all sides. We note that two of our critics, Neaves and Teitelbaum, are founding members of a political group whose Web site lists over 70 conditions that ''could someday be treated or cured'' using embryonic stem cells. High on this list is Alzheimer's disease, acknowledged by experts as a ''very unlikely'' candidate for stem cell treatments, with one NIH expert describing such a scenario as a ''fairy tale''. The entire list, in fact, is based on no evidence of benefit in any human patient from embryonic stem cells and little evidence for its claims in animal models. No one should promote the falsehood that embryonic stem cell cures are imminent, for this cruelly deceives patients and the public.

CSC EXHIBIT 3

PEER-REVIEWED REFERENCES SHOWING APPLICATIONS OF ADULT STEM CELLS THAT PRODUCE THERAPEUTIC BENEFIT FOR HUMAN PATIENTS

ADULT STEM CELLS—HEMATOPOIETIC REPLACEMENT

CANCERS

Brain Tumors—medulloblastoma and glioma

Dunkel, IJ; ''High-dose chemotherapy with autologous stem cell rescue for malignant brain tumors''; Cancer Invest. 18, 492–493; 2000.

Abrey, LE et al.; ''High dose chemotherapy with autologous stem cell rescue in adults with malignant primary brain tumors''; J. Neurooncol. 44, 147–153; Sept., 1999.

Finlay, JL; ''The role of high-dose chemotherapy and stem cell rescue in the treatment of malignant brain tumors: a reappraisal''; Pediatr. Transplant 3 Suppl. 1, 87–95; 1999.

Retinoblastoma

Hertzberg H et al.; ''Recurrent disseminated retinoblastoma in a 7–year-old girl treated successfully by high-dose chemotherapy and CD34–selected autologous peripheral blood stem cell transplantation''; Bone Marrow Transplant 27(6), 653–655; March 2001.

Dunkel IJ et al.; ''Successful treatment of metastatic retinoblastoma''; Cancer 89, 2117–2121; Nov 15, 2000.

Ovarian Cancer

Stiff PJ et al.; ''High-dose chemotherapy and autologous stem-cell transplantation for ovarian cancer: An autologous blood and marrow transplant registry report''; Ann. Intern. Med. 133, 504–515; Oct. 3, 2000.

Schilder, RJ and Shea, TC; ''Multiple cycles of high-dose chemotherapy for ovarian cancer''; Semin. Oncol. 25, 349–355; June 1998.

Merkel Cell Carcinoma

Waldmann V et al.; ''Transient complete remission of metastasized merkel cell carcinoma by high-dose polychemotherapy and autologous peripheral blood stem cell transplantation''; Br. J. Dermatol. 143, 837–839; Oct 2000.

Testicular Cancer

Bhatia S et al.; ''High-dose chemotherapy as initial salvage chemotherapy in patients with relapsed testicular cancer''; J. Clin. Oncol. 18, 3346–3351; ct. 19, 2000.

Lymphoma

Tabata M et al.; ''Peripheral blood stem cell transplantation in patients over 65 years old with malignant lymphoma—possibility of early completion of chemotherapy and improvement of performance status''; Intern Med 40, 471–474; June 2001.

Josting, A; ''Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?''; J Clin Oncol 18, 332–339; 2000.

Koizumi M et al.; ''Successful treatment of intravascular malignant lymphomatosis with high-dose chemotherapy and autologous peripheral blood stem cell transplantation''; Bone Marrow Transplant 27, 1101–1103; May 2001.

Non-Hodgkin's Lymphoma

Buadi FK et al., Autologous hematopoietic stem cell transplantation for older patients with relapsed non-Hodgkin's lymphoma, Bone Marrow Transplant 37, 1017–1022, June 2006.

Tabata M et al.; ''Peripheral blood stem cell transplantation in patients over 65 years old with malignant lymphoma—possibility of early completion of chemotherapy and improvement of performance status''; Intern Med 40, 471–474; June 2001.

Josting, A; ''Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?''; J Clin Oncol 18, 332–339; 2000.

Kirita T et al.; ''Primary non-Hodgkin's lymphoma of the mandible treated with radiotherapy, chemotherapy, and autologous peripheral blood stem cell transplantation''; Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 90, 450–455; Oct. 2000.

Hodgkin's Lymphoma

Peggs KS et al., ''Clinical evidence of a graft-versus-Hodgkin's-lymphoma effect after reduced-intensity allogeneic transplantation'', Lancet 365, 1934–1941, 4 June 2005.

Josting, A; ''Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?''; J Clin Oncol 18, 332–339; 2000.

Acute Lymphoblastic Leukemia

Laughlin MJ et al.; ''Hematopoietic engraftment and survival in adult recipients of umbilical-cord blood from unrelated donors'', New England Journal of Medicine 344, 1815–1822; June 14, 2001.

Ohnuma K et al.; ''Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies''; Br J Haematol 112(4), 981–987; March 2001.

Marco F et al.; ''High Survival Rate in Infant Acute Leukemia Treated With Early High-Dose Chemotherapy and Stem-Cell Support''; J Clin Oncol 18, 3256–3261; Sept. 15 2000.

Acute Myelogenous Leukemia

Laughlin MJ et al.; ''Hematopoietic engraftment and survival in adult recipients of umbilical-cord blood from unrelated donors'', New England Journal of Medicine 344, 1815–1822; June 14, 2001.

Ohnuma K et al.; ''Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies''; Br J Haematol 112(4), 981–987; March 2001.

Gorin NC et al.; ''Feasibility and recent improvement of autologous stem cell transplantation for acute myelocytic leukaemia in patients over 60 years of age: importance of the source of stem cells''; Br. J. Haematol. 110, 887–893; Sept 2000.

Bruserud O et al.; ''New strategies in the treatment of acute myelogenous leukemia: mobilization and transplantation of autologous peripheral blood stem cells in adult patients''; Stem Cells 18, 343–351; 2000.

Chronic Myelogenous Leukemia

Laughlin MJ et al.; ''Hematopoietic engraftment and survival in adult recipients of umbilical-cord blood from unrelated donors'', New England Journal of Medicine 344, 1815–1822; June 14, 2001.

Ohnuma K et al.; ''Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies''; Br J Haematol 112(4), 981–987; March 2001.

Juvenile Myelomonocytic Leukemia

Ohnuma K et al.; ''Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies''; Br J Haematol 112(4), 981–987; March 2001.

Chronic Myelomonocytic Leukemia

Elliott MA et al., Allogeneic stem cell transplantation and donor lymphocyte infusions for chronic myelomonocytic leukemia,

Bone Marrow Transplantation 37, 1003–1008, 2006.

Angioimmunoblastic Lymphadenopathy with Dysproteinemia

Lindahl J et al.; ''High-dose chemotherapy and APSCT as a potential cure for relapsing hemolysing AILD''; Leuk Res 25(3), 267–270; March 2001.

Multiple Myeloma

Aviles A et al., Biological modifiers as cytoreductive therapy before stem cell transplant in previously untreated patients with multiple myeloma, Annals of Oncology 16, 219–221, 2005.

Vesole, DH et al.; ''High-Dose Melphalan With Autotransplantation for Refractory Multiple Myeloma: Results of a Southwest Oncology Group Phase II Trial''; J Clin Oncol 17, 2173–2179; July 1999.

Myelodysplasia

Ohnuma K et al.; ''Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies''; Br J Haematol 112(4), 981–987; March 2001.

Bensinger WI et al.; ''Transplantation of bone marrow as compared with peripheral-blood cells from HLA-identical relatives in patients with hematologic cancers''; New England Journal of Medicine 344, 175–181; Jan 18 2001.

Breast Cancer

Damon LE et al.; ''High-dose chemotherapy and hematopoietic stem cell rescue for breast cancer: experience in California''; Biol. Blood Marrow Transplant 6, 496–505; 2000.

Paquette, RL et al., ''Ex vivo expanded unselected peripheral blood: progenitor cells reduce posttransplantation neutropenia, thrombocytopenia, and anemia in patients with breast cancer'', Blood 96, 2385–2390; October, 2000.

Stiff P et al.; ''Autologous transplantation of ex vivo expanded bone marrow cells grown from small aliquots after high-dose chemotherapy for breast cancer''; Blood 95, 2169–2174; March 15, 2000.

Koc, ON et al.; ''Rapid Hematopoietic Recovery After Coinfusion of Autologous-Blood Stem Cells and Culture-Expanded Marrow Mesenchymal Stem Cells in Advanced Breast Cancer Patients Receiving High-Dose Chemotherapy''; J Clin Oncol 18, 307–316; January 2000.

Neuroblastoma

Kawa, K et al.; ''Long-Term Survivors of Advanced Neuroblastoma With MYCN Amplification: A Report of 19 Patients Surviving Disease-Free for More Than 66 Months''; J Clin Oncol 17:3216–3220; October 1999.

Renal Cell Carcinoma

Barkholt L et al., Allogeneic haematopoietic stem cell transplantation for metastatic renal carcinoma in Europe, Annals of Oncology published online 28 April 2006.

Arya M et al., Allogeneic hematopoietic stem-cell transplantation: the next generation of therapy for metastatic renal cell cancer, Nat Clin Pract Oncol. 1, 32–38, Nov 2004.

Childs R et al., ''Regression of Metastatic Renal-Cell Carcinoma after Nonmyeloablative Allogeneic Peripheral-Blood Stem-Cell Transplantation'', New England Journal of Medicine 343,750–758; Sept. 14, 2000.

Childs, RW; ''Successful Treatment of Metastatic Renal Cell Carcinoma With a Nonmyeloablative Allogeneic Peripheral-Blood Progenitor-Cell Transplant: Evidence for a Graft-Versus-Tumor Effect:; J Clin Oncol 17, 2044–2049; July 1999.

Soft Tissue Sarcoma

Blay JY et al.; ''High-dose chemotherapy with autologous hematopoietic stem-cell transplantation for advanced soft tissue sarcoma in adults''; J. Clin. Oncol. 18, 3643–3650; Nov 1, 2000.

Ewing's Sarcoma

Drabko K et al., Megachemotherapy followed by autologous stem cell transplantation in children with Ewing's sarcoma, Pediatric Transplantation 9, 618–621, 2005.

Various Solid Tumors

Pedrazolli P et al., High dose chemotherapy with autologous hematopoietic stem cell support for solid tumors other than breast cancer in adults, Annals of Oncology published online 17 March 2006.

Nieboer P et al.; ''Long-term haematological recovery following high-dose chemotherapy with autologous bone marrow transplantation or peripheral stem cell transplantation in patients with solid tumours''; Bone Marrow Transplant 27, 959–966; May 2001.

Lafay-Cousin L et al.; ''High-dose thiotepa and hematopoietic stem cell transplantation in pediatric malignant mesenchymal tumors: a phase II study''; Bone Marrow Transplant 26, 627–632; Sept. 2000.

Michon, J and Schleiermacher, G. ''Autologous haematopoietic stem cell transplantation for paediatric solid tumors'', Baillieres Best Practice Research in Clinical Haematology 12, 247–259, March–June, 1999.

Schilder, RJ et al.; ''Phase I trial of multiple cycles of high-dose chemotherapy supported by autologous peripheral-blood stem cells''; J. Clin. Oncol. 17, 2198–2207; July 1999.

Waldenstrom's Macroglobulinemia

Anagnostopoulos A et al.; ''High-dose chemotherapy followed by stem cell transplantation in patients with resistant Waldenstrom's macroglobulinemia''; Bone Marrow Transplant 27, 1027–1029; May 2001.

Hemophagocytic Lymphohistiocytosis

Matthes-Martin S et al.; ''Successful stem cell transplantation following orthotopic liver transplantation from the same haploidentical family donor in a girl with hemophagocytic lymphohistiocytosis''; Blood 96, 3997–3999; Dec 1, 2000.

POEMS Syndrome (Osteosclerotic Myeloma)

Dispenzieri A et al., Peripheral blood stem cell transplantation in 16 patients with POEMS syndrome, and a review of the literature, Blood 104, 3400–3407, 15 November 2004.

Myelofibrosis

Cometta K et al., Umbilical cord blood transplantation in adults: results of the prospective Cord Blood Transplantation (COBLT), Biol Blood Marrow Transplant 11, 149–160, February 2005.

Cervantes F, Modern management of myelofibrosis, Br J Haematol 128, 583–592, March 2005.

Kroger N et al., Pilot study of reduced-intensity conditioning followed by allogeneic stem cell transplantation from related and unrelated donors in patients with myelofibrosis, Br J Haematol 128, 690–697, March 2005.

Thiele J et al., Dynamics of bone marrow changes in patients with chronic idiopathic myelofibrosis following allogeneic stem cell transplantation, Histol Histopathol 20, 87–89, July 2005.

Rondelli D et al., Allogeneic hematopoietic stem-cell transplantation with reduced-intensity conditioning in intermediate- or high-risk patients with myelofibrosis with myeloid metaplasia, Blood 105, 4115–4119, 15 May 2005.

Benesova Pet al., [Complete regression of bone marrow fibrosis following allogeneic peripheral blood stem cell transplantation in a patient with idiopathic myelofibrosis] [Article in Czech], Cesk Patol 40, 167–171, October 2004.

ADULT STEM CELLS—IMMUNE SYSTEM REPLACEMENT

AUTOIMMUNE DISEASES

Systemic Lupus

Burt RK et al., Nonmyeloablative hematopoietic stem cell transplantation for systemic lupus erythematosus, Journal of the American Medical Association 295, 527–535, February 1, 2006.

Burt RK et al., ''Induction of tolerance in autoimmune diseases by hematopoietic stem cell transplantation: getting closer to a cure?'', Blood 99, 768–784, 1 February 2002.

Wulffraat NM et al.; ''Prolonged remission without treatment after autologous stem cell transplantation for refractory childhood systemic lupus erythematosus''; Arthritis Rheum 44(3), 728–731; March 2001.

Rosen O et al.; ''Autologous stem-cell transplantation in refractory autoimmune diseases after in vivo immunoablation and ex vivo depletion of mononuclear cells''; Arthritis Res. 2, 327–336; 2000.

Traynor AE et al.; ''Treatment of severe systemic lupus erythematosus with high-dose chemotherapy and haemopoietic stem-cell transplantation: a phase I study''; Lancet 356, 701–707; August 26, 2000.

Burt, RK and Traynor, AE; ''Hematopoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease''; Stem Cells 17, 366–372; 1999.

Burt RK et al.; ''Hematopoietic stem cell transplantation of multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus''; Cancer Treat. Res. 101, 157–184; 1999.

Traynor A and Burt RK; ''Haematopoietic stem cell transplantation for active systemic lupus erythematosus''; Rheumatology 38, 767–772; August 1999.

Martini A et al.; ''Marked and sustained improvement 2 years after autologous stem cell transplant in a girl with system sclerosis''; Rheumatology 38, 773; August 1999.

Sjogren's Syndrome

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Myasthenia

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Autoimmune Cytopenia

Passweg, JR et al., Haematopoetic stem cell transplantation for refractory autoimmune cytopenia, British Journal of Haematology 125, 749–755, June 2004.

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Scleromyxedema

A.M. Feasel et al., ''Complete remission of scleromyxedema following autologous stem cell transplantation,'' Archives of Dermatology 137, 1071–1072; Aug. 2001.

Scleroderma

Burt RK et al., ''Induction of tolerance in autoimmune diseases by hematopoietic stem cell transplantation: getting closer to a cure?'', Blood 99, 768–784, 1 February 2002.

Burt, RK and Traynor, AE; ''Hematopoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease''; Stem Cells 17, 366–372; 1999.

Crohn's Disease

Kreisel W et al., Complete remission of Crohn's disease after high-dose

cyclophosphamide and autologous stem cell transplantation, Bone Marrow Transplantation 32, 337–340, 2003.

Burt RK et al., ''High-dose immune suppression and autologous hematopoietic stem cell transplantation in refractory Crohn disease'', Blood 101, 2064–2066, March 2003.

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Hawkey CJ et al.; ''Stem cell transplantation for inflammatory bowel disease: practical and ethical issues''; Gut 46, 869–872; June 2000.

Behcet's Disease

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Rheumatoid Arthritis

Burt RK et al., ''Induction of tolerance in autoimmune diseases by hematopoietic stem cell transplantation: getting closer to a cure?'', Blood 99, 768–784, 1 February 2002.

Burt RK et al., ''Induction of remission of severe and refractory rheumatoid arthritis by allogeneic mixed chimerism'', Arthritis & Rheumatism 50, 2466–2470, August 2004.;

Verburg RJ et al.; ''High-dose chemotherapy and autologous hematopoietic stem cell transplantation in patients with rheumatoid arthritis: results of an open study to assess feasibility, safety, and efficacy''; Arthritis Rheum 44(4), 754–760; April 2001.

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Burt, RK and Traynor, AE; ''Hematopoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease''; Stem Cells 17, 366–372; 1999.

Burt RK et al.; ''Hematopoietic stem cell transplantation of multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus''; Cancer Treat. Res. 101, 157–184; 1999.

Burt, RK et al., ''Autologous hematopoietic stem cell transplantation in refractory rheumatoid arthritis: sustained response in two of four patients'', Arthritis & Rheumatology 42, 2281–2285, November, 1999.

Juvenile Arthritis

I M de Kleer et aI., Autologous stem cell transplantation for refractory juvenile idiopathic arthritis: analysis of clinical effects, mortality, and transplant related morbidity, Ann Rheum Dis 63, 1318–1326, 2004.

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Burt, RK and Traynor, AE; ''He-ma-topoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease''; Stem Cells 17, 366–372; 1999.

Multiple Sclerosis

Saccardi R et al., Autologous HSCT for severe progressive multiple sclerosis in a multicenter trial: impact on disease activity and quality of life, Blood 105, 2601–2607, 15 March 2005.

Burt RK et al., ''Induction of tolerance in autoimmune diseases by hematopoietic stem cell transplantation: getting closer to a cure?'', Blood 99, 768–784, 1 February 2002.

Mancardi GL et al.; ''Autologous hematopoietic stem cell transplantation suppresses Gd-enhanced MRI activity in MS''; Neurology 57, 62–68; July 10, 2001.

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85 (11 Suppl), 81–85; Nov. 2000.

Burt, RK and Traynor, AE; ''He-ma-topoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease''; Stem Cells 17, 366–372; 1999.

Burt RK et al.; ''Hematopoietic stem cell transplantation of multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus''; Cancer Treat. Res. 101, 157–184; 1999.

Polychondritis

Rosen O et al.; ''Autologous stem-cell transplantation in refractory autoimmune diseases after in vivo immunoablation and ex vivo depletion of mononuclear cells''; Arthritis res. 2, 327–336; 2000.

Systemic Vasculitis

Rabusin M et al.; ''Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease''; Haematologica 85(11 Suppl), 81–85; Nov. 2000.

Alopecia Universal

Seifert B et al., Complete rfemission of alopecia universalis after allogeneic hematopoietic stem cell transplantion, Blood 105, 426–427, 1 January 2005.

Buerger's Disease

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IMMUNODEFICIENCIES

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ADULT STEM CELLS-REPAIR/REPLACEMENT OF SOLID TISSUES

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EXHIBIT 4

[From the Journal of the American Medical Association, Apr. 11, 2007]

AUTOLOGOUS NONMYELOABLATIVE HEMATOPOIETIC STEM CELL TRANSPLANTATION IN NEWLY DIAGNOSED TYPE 1 DIABETES MELLITUS

Julio C. Voltarelli, MD, PhD; Carlos E.B. Couri, MD, PhD; Ana B.P.L. Stracieri, MD, PhD; Maria C. Oliveira, MD, MSc; Daniela A. Moraes, MD; Fabiano Pieroni, MD, PhD; Marina Coutinho, MD, MSc; Kelen C.R. Malmegrim, PhD; Maria C. Foss-Freitas, MD, PhD; Belinda P. Simões, MD, PhD; Milton C. Foss, MD, PhD; Elizabeth Squiers, MD; and Richard K. Burt, MD.

Context: Type 1 diabetes mellitus (DM) results from a cell-mediated autoimmune attack against pancreatic beta cells. Previous animal and clinical studies suggest that moderate immunosuppression in newly diagnosed type 1 DM can prevent further loss of insulin production and can reduce insulin needs.

Objective: To determine the safety and metabolic effects of high-dose immunosuppression followed by autologous nonmyeloablative hematopoietic stem cell transplantation (AHST) in newly diagnosed type 1 DM.

Design, Setting, and Participants: A prospective phase 1/2 study of 15 patients with type 1 DM (aged 14–31 years) diagnosed within the previous 6 weeks by clinical findings and hyperglycemia and confirmed with positive antibodies against glutamic acid decarboxylase. Enrollment was November 2003–July 2006 with observation until February 2007 at the Bone Marrow Transplantation Unit of the School of Medicine of Ribeirão Preto, Ribeirão Preto, Brazil. Patients with previous diabetic ketoacidosis were excluded after the first patient with diabetic ketoacidosis failed to benefit from AHST. Hematopoietic stem cells were mobilized with cyclophosphamide (2.0 g/m^2) and granulocyte colony-stimulating factor (10 μg/kg per day) and then collected from peripheral blood by leukapheresis and cryopreserved. The cells were injected intravenously after conditioning with cyclophosphamide (200 mg/kg) and rabbit antithymocyte globulin (4.5 mg/kg).

Main Outcome Measures: Morbidity and mortality from transplantation and temporal changes in exogenous insulin requirements (daily dose and duration of usage). Secondary end points: serum levels of hemoglobin A_{1C}, C-peptide levels during the mixed-meal tolerance test, and anti-glutamic acid decarboxylase antibody titers measured before and at different times following AHST.

Results: During a 7- to 36-month follow-up (mean 18.8),14 patients became insulin-free (1 for 35 months, 4 for at least 21 months, 7 for at least 6 months; and 2 with late response were insulin-free for 1 and 5 months, respectively). Among those, 1 patient resumed insulin use 1 year after AHST. At 6 months after AHST, mean total area under the C-peptide response curve was significantly greater than the pretreatment values, and at 12 and 24 months it did not change. Anti-glutamic acid decarboxylase antibody levels decreased after 6 months and stabilized at 12 and 24 months. Serum levels of hemoglobin A_{1C} were maintained at less than 7% in 13 of 14 patients. The only acute severe adverse effect was culture-negative bilateral pneumonia in 1 patient and late endocrine dysfunction (hypothyroidism or hypogonadism) in 2 others. There was no mortality.

Conclusions: High-dose immunosuppression and AHST were performed with acceptable toxicity in a small number of patients with newly diagnosed type 1 DM. With AHST, beta cell function was increased in all but 1 patient and induced prolonged insulin independence in the majority of the patients.

Trial Registration: clinicaltrials.gov Identifier: NCT00315133.

The PRESIDING OFFICER. The Senator from Washington is recognized.

Mrs. MURRAY. Mr. President, I yield myself 10 minutes from this side.

Mr. President, I come to the floor today to speak out in strong support of the promising research that can save lives and bring hope to millions of Americans. I will vote for the Stem Cell Enhancement Act of 2007, and I urge all of our colleagues to do so.

More importantly, I urge President Bush to finally hear the voices of scientists, medical leaders, patients, and more than 500 organizations that have said loudly and clearly that it is time for promising research to move forward in this country. It is time to take the handcuffs off of our scientists, those who say they will then be able to pursue what all Americans are hoping for and promising research for so many diseases that impact so many of our families. For too long, this President has allowed politics and ideology to trump lifesaving research. We have to correct that mistake. The bill, S. 5, we are considering today shows us how.

Throughout this country, Americans are suffering from diseases such as Parkinson's, Alzheimer's, diabetes, multiple sclerosis, and they and their families are looking to us for help. We have scientists and researchers who are so eager to provide that help, but today, as we all know, their hands are tied by the arbitrary restrictions President Bush imposed back in 2001.

I believe we can allow research on embryonic stem cells, and we can do so with strong ethical guidelines that are required under this legislation.

Back in August of 2001, President Bush greatly limited the number of embryonic stem cells that were available for federally funded research. Those limits were based on inaccurate science and ideology, and they have restricted our ability to make progress. At the time, the White House said there were 78 stem cell lines available for federally funded research, but now we know there are only 21 such lines. Researchers, those men and woman whom we count on to find cures to the diseases that impact so many, believe it is imperative to have access to newer, more promising stem cell lines that do not pose the risk of contamination.

The first consequence of the President's restriction has been to limit hope and to limit progress for families who suffer from these diseases. The second impact has been to push embryonic stem cell research overseas. That means that our country is falling behind other countries in a cutting-edge field.

Because of the President's imposed arbitrary limits, we are now in this country surrendering our scientific leadership to other countries. That can have far-reaching consequences for our economy and for our future.

My State of Washington is home to world-class research institutions such as the University of Washington. I want our country and institutions such as that to be the leading edge of scientific frontiers so our country and all of us can benefit from the new advances.

The bill we are considering today and will vote on this evening will lift the President's arbitrary restrictions and put in place expanded research under strict ethical guidelines. It would direct the Department of Health and Human Services to conduct and support research on stem cells that are derived from frozen embryos that are now stored in fertility clinics that would otherwise be destroyed. This bill also promotes research into finding alternative ways to derive stem cells that do not involve the destruction of an embryo. This bill imposes strong ethical guidelines. In fact, the guidelines in this bill are even stricter than the President's policy.

Embryonic stem cell research is a relatively young field. These cells were not even isolated in humans until 1998. Scientists believe that embryonic stem cells are more valuable than adult stem cells because they can develop into any type of cell or tissue in the body. Think of all the veterans who are coming home from the war in Iraq who have spinal cord injuries. Think of all the veterans of the first gulf war who are now being diagnosed with multiple sclerosis and who could be helped by this promising research.

In my own family, I have seen up close and personally the impact a disease such as multiple sclerosis can have. When I was 15 years old, my dad was diagnosed with multiple sclerosis.

I saw him in just a few years going from working to being someone who was home in a wheelchair every single day every single minute. For the rest of his life, my father was confined to a wheelchair. I can't tell you what a profound impact that had on my family. My mom had to stay home and raise myself and my six brothers and sisters. She had to go back to work and get a job and she had to stay home and take care of him, all at the same time. It was a very difficult time for my family. The medical bills were amazing. The challenges my family went through because of my dad's illness were incredible. I can only imagine what it might have been like had there been a cure for MS for my family and for thousands of others. When I was growing up, the promise of this type of research was not even on the horizon. Today that potential is in our hands. We need to do everything we can to make sure that that research is done so families such as mine have hope and opportunity in the future.

I hope we don't see it continually blocked by an ideological policy that puts politics over science. It is time to change course and put our Government on the side of the patients and their families and to give them hope again.

Last month the Director of the National Institutes of Health told us:

> [I]t is clear today that American science would be better served and the nation would be better served if we let our scientists have access to more cell lines . . .

The NIH Director said that existing lines will not be sufficient for the research that needs to be done, and he said that adult stem cells do not have the same potential as embryonic stem cells. That is the scientific view of the Director of the National Institutes of Health. The Senate and the President would be very wise to heed his counsel.

I know what it is like to grow up with someone who has a serious illness. I can only imagine what it would have been like to know there was hope and a chance for a cure. I know of many families out there who have been waiting for this day in the Senate, for us to vote and pass this important stem cell research bill. I commend Senator HARKIN for his perseverance in coming back and again pushing at this as one of the first pieces of legislation we consider in this Congress. We all know it has a ways to go. We know the President has said he might veto it. I hope he doesn't. I hope he sends a message to some young girl out there whose dad has just been diagnosed with multiple sclerosis that we are a country of hope once again.

I urge my colleagues to vote for S. 5. I look forward to its passage today, moving through conference. I hope it will be signed by the President.

I yield the floor.

Mr. HARKIN. Mr. President, how much time remains?

The PRESIDING OFFICER. The Senator from Iowa has 7 minutes remaining.

Mr. HARKIN. Mr. President, we are getting close to the end of the debate, we have some floor time in the next hour or so to go back and forth. I thought I might take a few moments now to talk about why it is so necessary to have NIH do this kind of research, to oversee this research. The Senator from Oklahoma said that a lot of research is going on now on embryonic stem cells. To be sure, it is. It is going on in different States, in private institutions, in England and Australia and France and Japan and Singapore and a few other countries. Why do we want to get the Federal Government involved? First, there is no other area of medical research in which we say the Federal Government should step aside and let the States do it. I know of no other area of medical research.

I always look at the human genome project. What if we had said to the States: We are not going to do it. You do it. They might have sequenced one gene or another or let the private sector do it. They would have been getting patents on it or everything like. Now we have the mapping and sequencing of the entire human gene, and you can go online and get it, free to everybody. Any researcher anywhere can get it. Now they may take that and develop it into drugs and therapies. That is fine. That is that sort of symbiotic relationship we have developed very well between the private pharmaceutical industry and the basic research industry, which is NIH.

Again, our National Institutes of Health should be involved in overseeing this, because if we don't have a coherent Federal policy on stem cells, each State writes its own rules. That means that different States may have different ethical guidelines. One State would be different from another. You would wind up with a patchwork quilt of laws. Then you would wind up with States competing against each other. So California gets to doing stem cell research, and what it does is, it hires researchers away from Missouri. Then Missouri is hiring people away from Iowa and then Ohio. Then New York is trying to bid people away from Ohio. You get this terrible State-versus-State kind of competition in stem cell research.

We don't want that. We ought to be doing it on a national basis, a national effort, and we should not lose the international leadership we have always had in biomedical research. Should we give it up to Singapore or to Korea or England? No. We have always been the leader in the world in biomedical research, and we should continue.

Secondly, the issue of why we have to expand our stem cell policy. Again, I repeat, for the sake of emphasis, of those 78 cell lines that were supposedly available on August 9, 2001, only 21 have been available. A lot of them are sick. They are not propagating properly. They are unhealthy. Right now NIH is only using between four and six of these lines and even they, I have been told, are not very healthy. So the restrictions we have had by the Bush administration, since August 9, 2001, have resulted in a situation where fewer and fewer viable good stem cell lines are available for NIH researchers. However, during that same period of time in other sectors, we have derived over 400 different cell lines. Yet no one who gets NIH funding is able to do any research on these healthy embryonic stem cell lines. That is why we need to develop these. We need to expand it.

That is what S. 5 does. S. 5 takes off the handcuffs. It lets us use, under strict ethical guidelines, those embryos that are slated to be discarded at IVF clinics. With all due respect to my friend from Georgia, S. 30 does not do that. S. 5, if passed, will do everything that S. 30 wants to do. If S. 5 passes, what they want to do in S. 30 can be done by NIH. The problem with S. 30 is, if S. 30 passes and S. 5 doesn't, then S. 30 is very limited. It says you can only use these few embryos that are naturally dead which, by the way, I don't think there is such a scientific term, but it has been bandied about here and it is in the bill. There is no such scientific delineation of what is naturally dead.

So that is the situation we are in. S. 5 will do both. It will open new stem cell lines with ethical guidelines. It will allow them to extract stem cells from these nonviable embryos. S. 30 will not. S. 30 still will not permit us to get the healthy stem cell lines our researchers need. That is why we need to pass S. 5.

Mr. President, how much time do I have remaining?

The PRESIDING OFFICER. The Senator has 2½ minutes remaining.

Mr. HARKIN. I will conclude my 2½ minutes then by referring to the other chart. Again, we have to keep in mind that the policy now in effect, the policy in effect right now says we could use Federal money to examine and do research on embryonic stem cells that were derived prior to 9 p.m., August 9, 2001. But we can't use Federal money to examine or to do research on stem cells derived after 9 p.m., August 9, 2001. Those are morally unacceptable. Before 9 p.m., August 9, 2001, that is morally OK. After 9 p.m., it is not morally OK. Who decided that 9 p.m. on August 9, 2001, was some kind of moral dividing line, that stem cells derived before that, that is OK, but stem cells derived after that, that is not OK? Only one person decided that, and that was President Bush.

The people of this country didn't decide that. Ethicists didn't decide that. Theologians didn't decide that. Scientists didn't decide that. President Bush decided that. It is sheer hypocrisy to say we can fund those before, but we can't fund those after. That is the situation we find ourselves in today.

Let's take off the handcuffs. Let's get rid of that fake moral dividing line that has no substance in reality and let's get on with finding the cures for

people with Parkinson's and Alzheimer's and spinal cord injuries. That is what S. 5 is all about.

I yield the floor.

The PRESIDING OFFICER. Who yields time?

The Senator from Minnesota.

Mr. COLEMAN. Mr. President, I thank my colleague, the Senator from Georgia, for his leadership on this issue, his passion, his knowledge. He is not a biologist, but I have learned more about God and principle and stem cell lines from that former real estate guy than the many doctors I have talked to.

I also thank my colleague from Iowa. I went to law school at the University of Iowa. I think I have some Iowa roots. The Senator from Iowa has been a champion of those with disabilities, of disability rights, a champion of hope for a long time. In this debate there is so much we agree on. Where we disagree, though, is that S. 30 is not about a few small lines. S. 30 is about opening up embryonic stem cell research, research on pluripotent embryonic stem cells, in part, one technique being dead embryos; another technique being alternate nuclear transfer, all of which have numerous scientists who say there is hope for moving the science forward, and we could do it in a way that doesn't involve the destruction of the human embryo so we don't cross a moral line but we have all the research we want.

You may ask: How can something so small be so important? To my right is a chart showing a pinhead. These are the embryonic stem cells right there. They are the size of a pinhead. That is how big they are. How could something so small be so important? Size is not the measure of moral meaning. If you look at it, this point of view from outer space, and look at the people, that is small, but that crowd has meaning. If you look at it from a universe perspective to the Earth, boy, that is really small. You can't even see it. It is not even the size of a pinhead. Or our galaxy, if I had a picture of the universe, our galaxy would be the size of a pinhead. What we are talking about today has meaning. We have an opportunity in this country to come together and put the politics aside, the ideological divisions aside. The debate over Federal funding, which has been longstanding Federal policy, we do not provide Federal funding for the destruction of a human embryo, and we don't have to. We come together with the same intention. We come together with the same perspective, with the same hope.

There are two paths to follow. One is S. 5, which will be vetoed and, in the end, what we will have tomorrow in terms of research is what we have today, well intentioned, but again, unfortunately, because the moral line is crossed and the division that will create, it will be vetoed. There will be no movement forward.

But if we pass S. 30, we have the opportunity to move the science forward, to create a full range of pluripotent embryonic stem cells. By the way, if you are just using IVF stem cells, it is a narrow universe. But with the dead embryo and the altered nuclear transfer, you can cover every race and ethnic group in America.

The science has gotten way ahead of the politics. We can put ideology aside. We can put political division aside. We can offer real hope and real advancement without crossing a moral line. Why wouldn't we do that? I hope my colleagues see the wisdom in offering hope, in moving the science forward, and not falling victim to a Presidential veto, but that, in the end, by next year saying we have more Federal dollars going into embryonic stem cell research, research on pluripotent stem cells, stem cells that have the capacity to be perhaps anything. We don't know, but there is still hope.

There is a lot of research that has to go into it, but we can open the doors with the passage of S. 30. I urge my colleagues to vote for S. 30.

With that, I yield the floor and yield back the remainder of our time.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. ISAKSON. Mr. President, it is my understanding, according to the unanimous consent agreement, we have four 10-minute periods.

The PRESIDING OFFICER. The Senator is correct.

Mr. ISAKSON. Mr. President, it is further my understanding the first of those four periods is controlled by me; is that correct?

The PRESIDING OFFICER. Each Senator controls 10 minutes in no particular order.

Mr. ISAKSON. Mr. President, I will take that time as allocated.

The PRESIDING OFFICER. The Senator from Georgia is recognized for 10 minutes.

Mr. ISAKSON. Mr. President, I thank the Senator from Iowa and the Senator from Minnesota for their diligent work over the last 2 days on the floor of the Senate dealing with this issue. I admire the passion of both. I am so pleased their passion is rooted in their belief, which I share, that we can move science forward, that we can enhance research for what are currently incurable diseases, and that we can do so in the public domain.

Senator HARKIN made a very good statement—he has made a number of good statements, but he made a good statement a little bit ago about why NIH is important. NIH is important because the research gets in the public domain, not in the proprietary domain of an investor or someone who is hoping to find something but does not want to share that with anybody else. So it is important to find a way to get the NIH investment in the embryonic stem cell research. S. 5 and S. 30 approach it from a different direction, but the goal in the end is the same; that is, to further the science and to find cures.

I grew up in the 1950s and 1960s. In the 1960s, I am reminded of a statement I heard—often repeated—by then Senator and previously Attorney General Robert Kennedy. I remember a particular speech he made, when, having returned from Biafra, where there was a terrible famine at that time, he said: Some people see things as they are, and ask, why?—referring to famine. I—meaning him—see things as they never were and ask, why not?

That is what this is all about. Why not find cures? And why not find ways to seek those cures that pass the test we desire to pass that S. 30 portends? I have stated on more than one occasion the methodology and the derivation of these stem cells. It has been questioned a couple of times, but facts are stubborn. BGO1, BG02, and BG03, currently under the investment domain of the National Institutes of Health—lines for which diabetes research, neurological progenitor cell research, and other research takes place at this very day—were all derived from embryos that had passed the seventh day following in vitro fertilization, were naturally dead or arrested but contained pluripotent embryonic stem cells.

I might add, in vitro fertilization takes place every day in the United States of America. My family has been touched by it. Many families have been touched by it. In each of those processes, the development of those embryos goes through the three stages I have referred to: Gardner principle I, the first 72 hours; Gardner principle II, the next 4 days; and then those thereafter where the cells stop dividing, where the pluripotent stem cells exist but the embryo is not implanted.

Now, there have been some who have talked about: Well, there is no evidence of success yet in stem cells. I join Senator HARKIN in his statement that the only way you find out about evidence of success is by doing the research. But I want to read something I think is important and I am proud to share because research that has been done on BGO1 and 03—two of those three lines derived in this methodology—have had significant research conducted on them in a number of areas. This has a little bit of technical language, but it expresses the promise and the hope the Senator from Iowa and I and the Senator from Minnesota have all talked about. I quote:

> The directed differentiation of BGO1 and BG03 cells to neuroepithelia and multiple differentiated neuronal lineages, including cells expressing multiple markers of the midbrain dopaminergic lineage, has previously been demonstrated.

''Previously been demonstrated.'' That statement was confirming the research on BG01 and 03, designed to see if there was a way to develop neurological cells that could carry the hope for cures to spinal cord injury and, in fact, to neurological cell or brain cell injury.

From the research on those three lines, a patent is now pending on a neurological progenitor cell process, which

is a real advancement from embryonic stem cell research, from embryonic stem cells derived from level III Gardner principle derivation or those derived from an arrested or a dead embryo.

So I would submit my passion for S. 30 is in the hope of finding cures, in the hope of avoiding a veto, and, instead, having an investment in the furtherance of science that can grow exponentially because of the unlimited moral and ethical access that would exist toward these stem cells.

I conclude by encouraging all the Members of the Senate to thoughtfully consider S. 30 and encourage them to vote for it as a step in the right direction, the opening of a door that has, in fact, not been shut but stuck, and an opportunity to do what everybody in this Chamber has stated affirmatively they want to do; that is, provide hope for those who do not have it, expand research in the public domain at the National Institutes of Health, and invest tax dollars ethically in a process that brings a promise of hope to every single American.

Mr. President, I yield back my time.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. HARKIN. Mr. President, again, let me ask, we have, I guess, 20 minutes; is that right?

The PRESIDING OFFICER. The Senator from Iowa controls 10 minutes. The designee of the majority leader controls 10 minutes.

Mr. HARKIN. Yes. I yield 5 minutes to the Senator from Utah.

Mr. HATCH. I thank my colleague.

The PRESIDING OFFICER. The Senator from Utah is recognized for 5 minutes.

Mr. HATCH. Mr. President, I am going to vote for S. 30. I do not think it does anything more than the current law is but, nevertheless, I appreciate the intentions of the two Senators, my dear friends, who have done this.

Mr. President, as this debate draws to a close, I want to take one last opportunity to give my strong endorsement to the need for our country to provide a better level of support for a very promising line of scientific inquiry: embryonic stem cell research.

While I will vote in favor of both bills, it is S. 5, the Stem Cell Research Enhancement Act of 2007, that provides the promise of making a dramatic, yet ethical, difference in the lives of so many. S. 5 offers people hope who have no hope today. S. 5 has the potential to save lives. S. 5 opens up a door to medical research that offers much promise to both the scientific community and the patient community. And why is that? Because S. 5 allows the Federal Government to fund the most promising line of stem cell research—embryonic stem cell research—and S. 30 does not.

Make no mistake about it. Under the current policy, the President's policy, our Government does support embryonic stem cell research. All S. 5 would do is expand that policy.

To those who raise questions about the ethicality of this bill, I answer this way: If it was ethical to implement such a policy in 2001—and I have heard little criticism about that—then it should be ethical to adopt S. 5 as well.

Let me underscore the need for this bill with what one of the leading embryonic stem cell researchers in our country has had to say. I am speaking about the University of Utah's eminent researcher, Dr. Mario Cappecchi.

For the benefit of each Senator, the doctor has boiled down the arguments in favor of the Government funding embryonic stem cell research. I think it bears repeating, as this is knowledge crucial to each Member's understanding of what is one of the most critical issues facing this body today.

Indeed, I believe history will judge us very harshly if we allow this great opportunity to pass us by. We have to support this research which to date holds forth more promise than other types of stem cell inquiry. In the interest of all those who suffer from debilitating diseases and hope for deliverance, I implore my colleagues to vote for S. 5 and send a clear message to the American people that we want this research to be expanded for the good of mankind—of all mankind.

There should be Federal funding for embryonic stem cell research because: No. 1, it is a potential source of cures; No. 2, embryonic stem cells grow quickly and are versatile; No. 3, in contrast, adult stem cells grow slowly; No. 4, adult stem cells are very restricted in what cell types they can produce; No. 5, the tissue in many important organs does not have adult stem cells so therapies for diseases involving those tissues would not be readily approachable by adult stem cell-based therapy; No. 6, the usefulness of existing embryonic stem cell lines is extremely limited; No. 7, somatic cell nuclear transfer is an important research tool; No. 8, SCNT allows production of patient-specific stem cells to treat complex human diseases like Alzheimer's and Parkinson's; No. 9, lack of Government commitment means lack of future researchers; and No. 10, the health and economic implications of human stem cell research are enormous. Other countries have realized this; we are in grave danger of falling behind.

I read Dr. Cappecchi's points again for one reason—I want all of my colleagues to recognize that much is weighing in the balance on today's vote.

Therefore, I ask my colleagues to consider carefully the positions they take today.

In the interests of all those who suffer from debilitating diseases and hope for deliverance, I urge my colleagues to vote for S. 5.

Let me close by making a point I made to President Bush back in 2001:

In the opening days of your term in office, scientists have completed the task of sequencing the human genome. While this accomplishment—the work of many in the public and private sectors—is of historical significance, it is only the end of the beginning in a new era of our understanding of the biological sciences. Over your next eight years in office, you have an unprecedented opportunity to provide the personal leadership required to see to it that your Administration will be remembered by future historians as the beginning of the end for such deadly and debilitating diseases as cancer, Alzheimer's and diabetes.

That is what S. 5 is all about—providing a potential new avenue of research that may lead to treatments and cures for many diseases that afflict many families across our Nation and the world.

While I have no objections to S. 30, let us not delude ourselves into thinking it is the best solution. S. 5 is the bill that will clearly make a significant difference in the future of medical research for all of the reasons I have outlined today.

For those who oppose any type of embryonic stem cell research, let me say this: For the life of me, I cannot understand how we can destroy 7,000 to 20,000 live in vitro fertilized eggs every year—just destroy them, kill them—without using those for the benefit of—let's just choose one malady—kids with diabetes, virulent diabetes, who might lose their eyes, their hands, their feet. Why wouldn't we do everything in our power to utilize those rather than cast them aside as hospital waste? I cannot understand that. That is not pro-life; that is prodeath. Frankly, being pro-life is not just caring for the unborn, it is caring for the living as well.

While I will be voting for both S. 5 and S. 30, I believe that S. 5 is clearly preferable to S. 30. S. 5 permits Federal funding for embryonic stem cell research, S. 30 does not. S. 5 is the bill that will clearly make a significant difference in the future of medical research for all of the reasons I have outlined today.

I urge all of my colleagues to vote in favor of S. 5.

The PRESIDING OFFICER. The Senator has used 5 minutes.

Mr. HATCH. I thank my dear colleague for allowing me to make those remarks on the floor. This is an important debate. I hope we can get the 67 votes that are essential because we are going to get them someday. It is just, why put it off another 2 years?

I thank my colleague.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. HARKIN. Mr. President, I thank my colleague, my friend from Utah, for a very strong, very powerful, poignant statement. There has been no stronger leader in this Senate on health, life issues than Senator HATCH. I thank him for his support of S. 5.

Mr. President, I yield 5 minutes to Senator SMITH of Oregon.

The PRESIDING OFFICER. The Senator from Oregon is recognized.

Mr. SMITH. Mr. President, I thank Senator HATCH and Senator HARKIN for their leadership on this vital issue.

The Senate today has conducted a very dignified debate on an issue that

brings us right to the edge of science and faith. I have argued for several years now that science and faith need not be in conflict on this issue. I have always supported in vitro fertilization, believing that is a noble way to help infertile couples to be parents.

Today in America there are probably a million children who are now Americans because of this process. The inevitable consequence, however, of in vitro fertilization is that excess embryos are created. The question we are debating is, frankly, whether they constitute human life, when does life begin.

My colleague, Senator HATCH, has argued nobly and long for the proposition that life begins not with a scientist, it begins with a mother. It begins when cells and spirit are joined to create a living soul. If you have an embryo in a petri dish and you leave it there for 1,000 years, at the end of that time, you will have an embryo in a petri dish for the simple, logical reason that life begins with mom. Life begins with the joining of flesh and the spirit. Then the question becomes: Is it more moral to throw all these embryos away or is it more moral to allow them to be utilized for medical miracles? I have reached the conclusion that we cannot have tomorrow's miracles if we tie scientists' hands with yesterday's rules.

I believe we can, consistent with religion, faith, science, and logic, allow embryonic stem cell research to proceed. We should do this because it is morally right. We should do this because the U.S. Government needs to show up to work on this vital issue. We should do this because the resources we can provide and the ethical boundaries we can create are essential for this new area of science to go forward, giving us a chance to cure some of the most horrible maladies that afflict humankind, whether it is Lou Gehrig's, whether it is Parkinson's, childhood diabetes, cancer, and more. We can't overpromise, but the people afflicted with this that I see all the time in the State of Oregon need our best effort, and they need us to keep hope alive.

So I urge my colleagues to vote for both the bills before us today because it is a morally right thing to do. It is a pro-life thing to do. It is important that an ethic of life care for the unborn as well as for those who are living, both the sanctity of life and the quality of life.

I believe life begins with mom, not in a science lab. Because of that, I am voting for this, and I do so with respect for the feelings of my colleagues who have a different theological conclusion. I believe that scripture and science are not in conflict on this issue and that life begins with mother.

With that I yield the floor, and I urge and affirm the vote on both these important pieces of legislation.

The PRESIDING OFFICER (Mr. OBAMA). Who yields time?

Mr. HARKIN. Mr. President, how much time remains?

The PRESIDING OFFICER. The Senator has 10 minutes of time as designee of the majority leader.

Mr. HARKIN. I thought I had 12 minutes left, until 5:15. Well, anyway, in closing, first let me thank my colleagues, Senator ISAKSON, Senator COLEMAN, Senator BROWNBACK, and others who have participated in this debate. It has been a very informed and a very good debate over the last 2 days. I thank my colleague, Senator ISAKSON, for his many courtesies. There were a lot of things we agree on and obviously there are things we disagree on, but that is the march of legislation in the Senate. I wish to thank Senator ISAKSON and others for their speeches and for their insight into this very important issue. I particularly wish to thank Senator HATCH and Senator SMITH for their great leadership on this and so many other health issues in the Senate and for their very poignant, very powerful statements they made on the Senate floor.

I started this whole debate yesterday morning by talking about hope, hope for cures for Parkinson's, to repair spinal cord injuries, to end the scourge of juvenile diabetes, to lift the death sentence of those afflicted with Lou Gehrig's disease, or ALS, hope for families with someone lost to Alzheimer's disease. S. 5, the bill before us that will be our first vote, is a bill that provides this hope, not a hope based on dreams or fiction but based on solid scientific foundation. It is why 525 disease-related groups and research institutions and universities all support S. 5, because it has solid scientific foundation. It is why the Director of NIH, Dr. Zerhouni, recently said more embryonic stem cell lines needed to be investigated:

> It is clear today that American science would be better served and the Nation would be better served if we let our scientists have access to more cell lines.

That is what S. 5 does: provides more cell lines.

It is why the former Director of NIH, Dr. Varmus, a Nobel laureate, supports S. 5, to take the handcuffs off our scientists. I wish to make it again abundantly clear, as there has been a lot of misinformation in the last couple of days on the floor, that S. 5 somehow contains money for the destruction of embryos. That is not true. I challenge anyone to show me in the bill anywhere where it contains any money for the destruction of embryos. It is simply not true. Anyone who says otherwise is simply not being accurate.

There are those who say: Well, the Federal Government shouldn't get involved. We can leave it up to the States and private entities. Well, we can't do that. We need coherence. We need to have the crown jewel of the Federal Government, the National Institutes of Health, to oversee this so we have good, strong ethical guidelines, so we have compatibility, so we have the kind of interplay between scientists that is necessary to advance scientific research. To leave it up to the States means we will have a patchwork quilt of laws all over this country when it should be a national effort—a national effort. Then we will have States bidding against one another for scientists to come to their States to do this research. We don't want that to happen.

Lastly, we cannot afford to lose our global leadership in biomedical research. We, the United States of America, have always been the world's leader in biomedical research. All the great scientific discoveries, whether it is the polio vaccine, smallpox, all these things that have made our lives better; all the new drugs we have for fighting AIDS around the world came from the United States. All the cancer interventions, the reason cancer is now on the decline is because of biomedical research in this country. We can't afford to lose that to other countries. We need to keep it in America.

So what it comes down to in the final analysis is simply this: If you want to promote good science, vote for S. 5. If you want strong ethical standards, S. 5 has the strongest ethical guidelines, stronger than what the Bush administration has right now and stronger than any other bill that has come before the floor of the Senate. If you want to move ahead with more cell lines, as Dr. Zerhouni wants, S. 5 is the bill that will provide those cell lines. If you want to put embryonic stem cell research into overdrive, to make it a national priority to do this research, S. 5 will put it into overdrive. If you want to say to Karli Borcherding right here, age 12, using 120 needles a month to give herself insulin shots because she has juvenile diabetes; if you want to say to Karli Borcherding and all the other kids with juvenile diabetes, if you want to say to them that we are going to give you hope, we are going to give you hope that your diabetes will be cured, hope that you can live a full and normal life; if you want to say to those families who have a loved one suffering from Alzheimer's, we are going to give you hope; if you want to say to those who have a family member suffering from Parkinson's disease or under the death sentence of ALS, we are going to give you hope—hope not based upon fiction, not based upon some will-of-the-wisp thoughts that somebody might have but hope based on solid science that scientists know we can use.

We have already taken embryonic stem cells and made nerve cells, motor neurons, bone cells, heart muscle cells. We know that it can be done. Yet our scientists are handcuffed today because of the policy laid down by President Bush on August 9 of 2001. It is time to lift those restrictions.

Some say the President will veto this bill. We can't decide what we do around here because a President—any President—threatens to veto something. We have to do what is right. We have to do what the people of America want us to do. We have to do what is in the best

interests of this country as we see our duty to do it. I hope the President will sign this bill. I hope he will see we have made our compromises, that we have strong ethical guidelines, that this is the way to give hope to Karli Borcherding.

So I hope we don't fall prey to: Well, we can't pass this because the President will veto it. We have to do what we think is right. The right thing to do is to support S. 5. As Senator HATCH so eloquently said, let those thousands of embryos that are being discarded every year in in vitro fertilization clinics, let them be used to provide life to other people, hope to Karli Borcherding, hope for people suffering from multiple sclerosis, spinal cord injuries. To me, that is the true ethical course to take. That is the guideline I think we must follow. Let those embryos be used to provide hope to these people.

Mr. President, I see my colleague and a cosponsor of our bill who has been a leader on this issue for so many years, and I yield the remainder of our time to Senator SPECTER of Pennsylvania.

The PRESIDING OFFICER. The Senator from Pennsylvania is recognized.

Mr. SPECTER. Mr. President, on so many merits, the support has been overwhelming to allow Federal funds to be used for embryonic stem cell research. There are 400,000 of these embryos which will be discarded. If they can produce life, no one would want to have research done. The fact is we appropriated $2 million and only about 135,000 of those 400,000 embryos have been used. So it is a matter of use them or lose them, pure and simple.

The only reason not to advance this research is on the life issue, and that is gone. We have had some of the staunchest pro-life supporters in this Chamber endorsing this bill and this concept. The potential for medical research to cure or ameliorate the worst maladies of our era will be present with the use of embryonic stem cell research. What is involved here is when the people of the United States will demonstrate sufficient political will to insist that the Congress and the White House adopt legislation to use Federal funding for embryonic stem cell research. That is the only question.

We started this on December 2, 1998, with the first hearing, and we have made a fair amount of progress. It is my hope the President will sign the bill and not veto it, but he has already said he will veto the bill. So with 110 million Americans directly, personally, or indirectly, through families with a stake on their health and on their family's health, it is a question of when America will move to insist the Congress act and, if necessary, override a Presidential veto. It is not a question of if it will be done, it is a question of when. I hope this discussion and the proceedings now will motivate the American people to say to Washington: Get it done.

The PRESIDING OFFICER. The Senator's time has expired.

The Senator from Kansas, under the previous agreement, is now controlling time and has 10 minutes.

Mr. BROWNBACK. Mr. President, I want to give two numbers to my colleagues: 613 and zero—$613 million spent on embryonic stem cell research since 2002 and the number of human treatments we have to show for it, which is zero, 613 to zero. I think those are two important numbers to remember when what we are after is cures, and we have cures to show. We have cures that are working, and we can take the next $613 million and invest it in places that are getting cures, such as adult stem cells, cord blood, and amniotic fluid.

Do we want to spend another $613 million and use Federal taxpayer dollars to destroy young human life in the process—an ethical boundary we have not thought wise to cross before? Do we want to cross that boundary and spend more money and still not get results, when we have a proven route we can take?

I urge my colleagues to reject and vote against S. 5 on two grounds. No. 1, ethical grounds. Embryonic stem cell research, even if presented in supposedly ethical terms, remains unethical, with the destruction of human life. No. 2, practical grounds. We don't have an infinite budget, and in the stem cell field, we need to put our money into areas where we are getting real results—the adult field—and not divert them to the speculative embryonic stem cell field. Let the private sector or the States do it. If they want to go into these areas, they can do so.

Let me discuss ethics. Will we sanction the destruction of nascent human life with Federal taxpayer dollars? That is the central question surrounding S. 5. Those voting for it would say yes. I say no. I respect my colleagues who look at this differently, but those are the facts.

No. 2, individuals should be treated with respect, whoever they are, wherever they are located, at whatever age or stage of life they are in. We should avoid prejudices. Each individual has an inalienable right to life.

Claims that embryos are merely ''potential life'' are not supported by the science. From biology textbooks, we learn:

> Although life is a continuous process, fertilization is a critical landmark because, under ordinary circumstances, a new, genetically distinct human organism is thereby formed. . . .

It takes place in the beginning. The embryo is not ''potential life,'' it is human life at that particular stage of development in the life cycle continuum. That is not SAM BROWNBACK; that is biology. The embryo would continue along the life cycle continuum if we were not interfering in its normal development by keeping it in a freezer or destroying it for experiments.

With the scientific fact in hand, we evaluate the facts in light of our ethical framework. For instance, we know the human embryo is a human life, so how should we treat it?

Human life has immeasurable value—we can all agree on that—from the youngest to the oldest. Human beings are ends in themselves. It is wrong to use any human as a means to an end, period. That has happened in human history before. It has always been regretted. Our value is intrinsic. Yes, we want to help and treat people with medical conditions, but we must not trample upon any human to achieve such a good end.

Treatments. There remain no embryonic human treatments or applications despite 25 years of embryonic work in animal models and a decade of work with human embryonic stem cells, and $613 million has been invested since 2002 at the Federal level. That doesn't include States, private, and other governments.

What we have learned about embryonic stem cells is that these cells form tumors when implanted. The scientific literature abounds with such stories. If you read this article from ''Stem Cells,'' you will find this:

> The expression of the insulin gene could be demonstrated only when the cells differentiated in vivo into teratomas.

Those are tumors.

Moving from the ethical to the practical, should we put millions or billions of dollars into speculative research on these tumor-forming embryonic stem cells or should we put our money where we are already getting strong results with adult stem cells?

I have this. It is the front page of the research journals on adult and cord blood stem cell research and the successes since 2002. Are there similar files for embryonic stem cells? No, there are none. Adult stem cells have no ethical strings attached. You can get them from an adult without causing the patient harm; you can harvest them from rich cord blood, and, as noted in the Journal of the American Medical Association on March 7 of this year, they can be obtained from amniotic fluid without causing harm to the unborn child.

When we started this debate yesterday, we were aware of at least 72 peer-reviewed, real human treatments and applications using adult stem cells. Now, with the breaking news yesterday on juvenile diabetes from Northwestern University in Chicago, worked on in Brazil, we are at 73. Again, there remain no embryonic stem cell applications.

I say to my colleagues, remember Jacki Rabon, a lady from Illinois, a constituent of the Senators from Illinois, who has spinal cord injuries. She had to go to Portugal to be treated. Do not divert funds away from successful adult stem cell treatments and force your constituents to go to Portugal at great personal expense. Vote against S. 5 and put the money into adult stem cell research.

Remember David Foege. For your constituents who have heart disease,

do not divert funds away from successful adult stem cell treatments. Do not force your constituents to go to Bangkok at great personal expense. Vote against S. 5.

Remember Dennis Turner. For your constituents with Parkinson's, don't divert funds away from successful adult stem cell treatments. Let us provide these treatments here in America. Vote against S. 5.

Remember the 13 diabetes patients whom we learned about yesterday who have gone 3 years insulin-free using a treatment with their own adult stem cells. Don't divert these funds away from this area. Vote against S. 5.

Mr. President, the Proverbs tell us that there is a way that seems right to man, but its end is the way of death. That seems right to some people. I respect their opinion and I respect them, but its end is the way of death. Killing young human life harms us as a culture, when we treat human life as property. We have done that, and we don't like the history associated with it.

These embryonic stem cells form tumors. Tumors remind me of death. Do we want to go that way, even though it may seem right? These embryos are going to be destroyed, so why not? Somebody on death row is going to be destroyed, so why not? Because they have dignity, and they remain dignified. We should treat them with dignity, as we should here. Vote against S. 5.

I yield the floor.

HONORING OUR ARMED FORCES

STAFF SERGEANT BRADLEY D. KING

Mr. BAYH. Mr. President, I rise today with a heavy heart and deep sense of gratitude to honor the life of a brave young man from Gas City. Bradley King, 28 years old, was killed on April 2 while deployed in Al Amiriyah, Iraq, when a roadside bomb exploded near his humvee. With his entire life before him, Bradley risked everything to fight for the values Americans hold close to our hearts, in a land halfway around the world.

Bradley attended Mississinewa High School, enlisting in the National Guard in 1997, a year before his graduation in 1998. Bradley enjoyed the military and felt a sense of duty to serve his community and country. The day before he was deployed, Bradley told his mother that he felt ''called to serve in the military for his country.'' His aunt described Bradley as ''a responsible young man determined to do his best for the people he loved.''

Bradley was killed while serving his country in Operation Iraqi Freedom. He was a member of the 2nd Battalion, 152nd Infantry Regiment, 76th Infantry Brigade, Marion, IN. MSG Bill Wallen, King's supervisor, told local media, ''he was a heck of a human being, he's what everybody else needs to be in this world.'' Staff Sergeant King leaves behind his wife Adrian and 15-month-old son Daethan.

Today, I join Bradley's family and friends in mourning his death. While we struggle to bear our sorrow over this loss, we can also take pride in the example he set, bravely fighting to make the world a safer place. It is his courage and strength of character that people will remember when they think of Bradley, a memory that will burn brightly during these continuing days of conflict and grief.

Bradley was known for his dedication to his family and his love of country. Today and always, Bradley will be remembered by family members, friends, and fellow Hoosiers as a true American hero, and we honor the sacrifice he made while dutifully serving his country.

As I search for words to do justice in honoring Bradley's sacrifice, I am reminded of President Lincoln's remarks as he addressed the families of the fallen soldiers in Gettysburg: ''We cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here.'' This statement is just as true today as it was nearly 150 years ago, as I am certain that the impact of Bradley's actions will live on far longer than any record of these words.

It is my sad duty to enter the name of Bradley D. King in the official RECORD of the U.S. Senate for his service to this country and for his profound commitment to freedom, democracy, and peace. When I think about this just cause in which we are engaged and the unfortunate pain that comes with the loss of our heroes, I hope that families like Bradley's can find comfort in the words of the prophet Isaiah, who said, ''He will swallow up death in victory; and the Lord God will wipe away tears from off all faces.''

May God grant strength and peace to those who mourn, and may God be with all of you, as I know He is with Bradley.

1ST LIEUTENANT NEALE SHANK

Mr. President, I also rise today with a heavy heart and deep sense of gratitude to honor the life of a brave young man from Fort Wayne. Neale Shank, 25 years old, died on March 30 while deployed in Baghdad on Operation Iraqi Freedom. With his entire life before him, Neale risked everything to fight for the values Americans hold close to our hearts, in a land halfway around the world.

Neale has been a lifelong Hoosier, graduating from Concordia Lutheran High School in Fort Wayne in 1999. First Lieutenant Shank graduated from the U.S. Military Academy at West Point in 2005. His valor over the course of his service in Iraq exemplifies Hoosier values and courage. He decided to attend West Point because, as he put it, ''it is not a job and it is not a way of life, the Army is my life.'' Neale enjoyed the military, and he believed that throughout all the hardships they faced he and his company were helping the Iraqi people. His grandfather described his grandson to local media outlets as an adventurous, active person saying, ''He was all boy, he wasn't no inside kid.''

Neale died while serving his country in Operation Iraqi Freedom. He was a member of the Headquarters and Headquarters Troop, 1st Squadron, 89th Cavalry Regiment, 10th Mountain Division based in Fort Drum, NY.

Today, I join Neale's family and friends in mourning his death. While we struggle to bear our sorrow over this loss, we can also take pride in the example he set, bravely fighting to make the world a safer place. It is his courage and strength of character that people will remember when they think of Neale, a memory that will burn brightly during these continuing days of conflict and grief.

Neale was known for his dedication to his community and his love of country. Today and always, Neale will be remembered by family members, friends, and fellow Hoosiers as a true American hero, and we honor the sacrifice he made while dutifully serving his country.

As I search for words to do justice in honoring Neale's sacrifice, I am reminded of President Lincoln's remarks as he addressed the families of the fallen soldiers in Gettysburg: ''We cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here.'' This statement is just as true today as it was nearly 150 years ago, as I am certain that the impact of Neale's actions will live on far longer than any record of these words.

It is my sad duty to enter the name of Neale M. Shank in the official RECORD of the U.S. Senate for his service to this country and for his profound commitment to freedom, democracy, and peace. When I think about this just cause in which we are engaged and the unfortunate pain that comes with the loss of our heroes, I hope that families like Neale's can find comfort in the words of the prophet Isaiah who said, ''He will swallow up death in victory; and the Lord God will wipe away tears from off all faces.''

May God grant strength and peace to those who mourn, and may God be with all of you, as I know He is with Neale.

PRIVATE FIRST CLASS ORLANDO E. GONZALEZ

• Mr. DODD. Mr. President, I rise today to pay my respects to Private First Class Orlando E. Gonzalez, who last month lost his life in the service of our country.

On the morning of Sunday, March 25, Private First Class Gonzalez was handing out candy to Iraqi children in the province of Diyala when a suicide